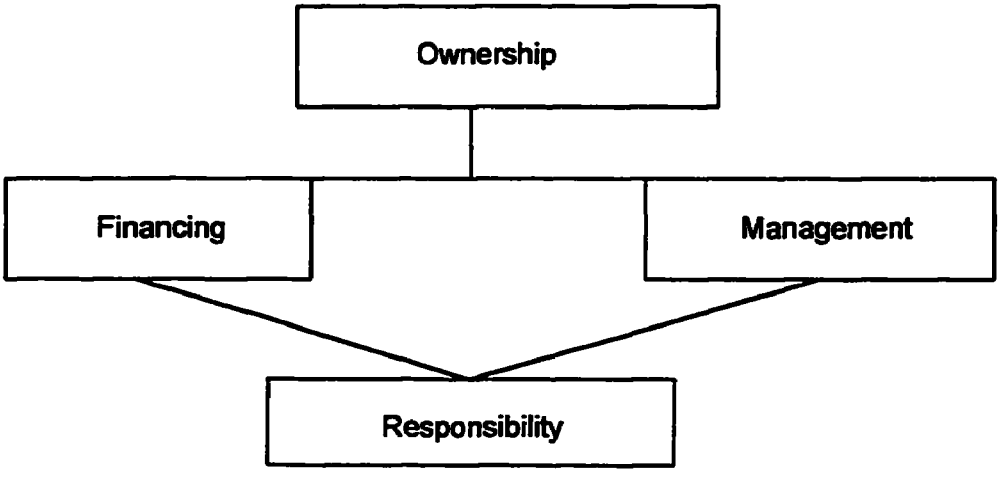
PART II

Agenda for Reform

5 BASIC BUILDING BLOCKS

Part II of this study builds on previous chapters dealing with the background and underlying causes of poor road maintenance policies and moves on from there to develop an agenda for reform. It asks, what can be done to improve road maintenance policies and, more generally, to strengthen the management and financing of roads as a whole? The key concept behind the reforms is *commercialization*: bring roads into the market place, put them on a *fee-for-service* basis and manage them like any other business enterprise. However, since roads are a public monopoly, and ownership of most roads will remain in government hands for some time, commercialization requires complementary reforms in four other important areas. These will be referred to as the *four basic building blocks*. They focus on: (i) creating **ownership** by involving road users in the management of roads to win public support for more road funding, to control potential monopoly power, and to constrain road spending to what is affordable; (ii) stabilizing road **financing** by securing an adequate and stable flow of funds; (iii) clarifying **responsibility** by clearly establishing who is responsible for what; and (iv) strengthening the **management** of roads by providing effective systems and procedures and strengthening managerial accountability (see Figure 5.1).

Figure 5.1 Commercialization of Roads: The Four Basic Building Blocks



1. *Ownership*: Involve road users (and other interested parties) in the management of roads to win public support for more road funding, to strengthen market discipline, and to constrain spending to what is affordable.

AND THEN

2. *Financing*: Establish an adequate and stable flow of funds and secure arrangements for channeling them to each road agency.

3. *Responsibility*: Establish a clear organizational structure and assign responsibilities to clarify who is responsible for what.

4. *Management*: Establish a more business-like road agency by introducing sound business practices and strengthening managerial accountability.

The four basic building blocks represent the core of the reforms. They are interdependent and should ideally be implemented together. Without all four, the reforms may only achieve part of their objective. You cannot solve the financing problem without the strong support of road users. And you cannot win the support of road users without taking steps to ensure that resources are used efficiently. And you cannot improve resource use unless you control monopoly power, constrain road spending to what is affordable, and increase managerial accountability. And you cannot hold managers accountable unless they have clearly defined responsibilities. There is nevertheless scope for flexibility. The reforms can be introduced in different ways, i.e., the content of each building block may differ, depending on country circumstances. They can move sequentially or in parallel, and both the sequencing and the pace of reform can vary. However, at the end of the day, all four building blocks should end up in place to ensure that the agenda is sustainable and doesn't drift back to the *status quo ante*.

The following paragraphs summarize the broad scope of each building block. Subsequent chapters describe them in more detail.

5.1 OWNERSHIP

Major policy reforms in the road sector cannot usually succeed without the active support of road users and other persons with a vested interest in sound road management. After all, these are the people who use the road network and also pay for it (whether through taxes or user charges). Given that current allocations for road maintenance are erratic and well below the levels needed to keep the road network in stable long-term condition, the first building block involves winning public support for more road funding and taking steps to ensure that road agencies do not operate as public monopolies and do not spend more on roads than the country can afford. This is an essential precondition for getting road users to willingly pay for roads on a fee-for-service basis. Most road users are unwilling to pay unless they can influence fee levels and are satisfied that the proceeds will be spent on roads, the work will be done efficiently, and managers will be relatively free from political interference. The usual mechanism for winning the support of road users is to involve them in the management of roads.

5.2 FINANCING

The second building block concentrates on establishing an adequate and stable flow of funds, usually by introducing an explicit road tariff to manage demand and generate the revenues needed to support the operation and maintenance of roads. Without an adequate flow of funds, none of the reforms will be sustainable. All governments in Africa are seriously short of fiscal revenues. Budget allocations for road maintenance rarely exceed 30 percent of requirements, and it is simply not feasible for governments to increase these allocations under present fiscal conditions. Improved revenue mobilization is essential. However, if road user charges are increased, there is no guarantee that the additional revenues will be allocated to roads. Furthermore, traditional earmarking is not a viable solution. It has adverse impacts on the management of the government's overall budget and is rarely sustainable. An added concern is that the current financing mechanisms do little to strengthen market discipline, either by

managing demand or by improving the efficiency of the road agency. Solving the financing problem calls for a radically new approach to road financing.

5.3 RESPONSIBILITY

The third building block concentrates on creating a consistent organizational structure for managing different parts of the road network. In other words, it focuses on establishing who is responsible for what. This requires a clear assignment of responsibility among different government departments and different levels of government and among individual road agencies. The arrangement needs to be based on an accurate road inventory, functional classification of roads, designation of appropriate road agencies, formal assignment of responsibility to each road agency, and clarification of the relationship between the road agency and the parent ministry. Responsibilities to be assigned include those for operation, maintenance, improvement, and development of the road network, for traffic management, for road accidents caused by the road agency's own negligence, and for the adverse environmental impacts associated with roads and road traffic.

5.4 MANAGEMENT

The fourth building block focuses on creating a more businesslike road agency. Once road users are involved in the management of roads, they generally press for the introduction of sound business practices to ensure that their constituents get value-for-money. Road users expect clear management objectives, competitive terms and conditions of employment, consolidated budgets, commercial costing systems, and effective management information systems. Introduction of sound business practices leads to consequential changes in managerial incentives. It brings pressure to dispose of in-house plant and equipment (or use it more efficiently), to do more work under contract, to control vehicle over-loading, and to improve road safety. These issues have become systemic sources of inefficiency in the road sector because current bureaucratic management procedures provide little incentive to do anything about them.

The following chapters elaborate on the four basic building blocks and propose a practical agenda for dealing with them in the African context.

6 OWNERSHIP

This chapter examines the issue of *ownership*, one of the most important building blocks in the agenda for reform. How can central and local governments encourage road users to take an active interest in the management of roads? This chapter tackles the topic in four stages. First, what is meant by ownership? Second, what grass roots organizations represent road users, and do they provide a sound basis for involving them in the management of roads? Third, how does one involve road users in the management of roads? Finally, how does one set about establishing a Roads Board?

6.1 CONCEPT OF OWNERSHIP

The idea of ownership is to empower road users and to encourage them to take an interest in the management of roads, since their enthusiastic support is a precondition for solving the problem of road financing (whether by raising taxes and reforming the budget process or by introducing an explicit road tariff). Ministries of finance are always reluctant to raise taxes and user charges. The public invariably complains, and the chances of persuading the ministry of finance to increase domestic revenue mobilization to finance more road maintenance is almost zero unless road users openly express willingness to provide the extra revenues. Since road users in Africa have every incentive to see more money spent on road maintenance (see Chapter 2), the issue comes down to finding ways of translating this interest into openly expressed support for a sustainable financing plan.

Road users also have their own vested interests. They may be willing to pay for roads, but only if the money is spent on roads and the work is done efficiently. This is another important concept and is part of the symbiotic relationship which underlies market discipline. Road users pay for roads but, in return, demand value-for-money. Road user involvement can thus create surrogate market discipline to encourage the road agency to use resources efficiently and prevent it from abusing its monopoly power. However, the benefits of ownership do not stop at financing and market discipline. Once road users are convinced that the government is trying to serve their needs, they will generally support a whole range of initiatives. Ownership can become the basis for a genuine partnership, with road users working with the government to improve road safety, control fuel smuggling (or at least find an alternative to the fuel levy for financing roads), and control overloading.

Zambia offers a good example of road users working with the government to address a wide range of road sector issues. The trucking industry takes an almost paternal interest in the road network: they are *their* roads. For example, the Federation of Zambian Road Hauliers (Fedhaul) provides financial support for the RMI secretariat in Zambia and has recently put forward a proposal which would improve administration of international transit fees (see Box 6.1). Furthermore, following an axle-load survey carried out by Fedhaul, which showed substantial overloading (particularly by foreign transit vehicles), the road transport industry as a whole requested that the transport ministry allow the private sector to enforce vehicle weights and dimensions regulations. This was done by appointing individuals nominated by the road

transport industry as volunteer Road Traffic Commissioners and using them to help enforce road transport regulations and supervise operation of weigh-bridges. This has already significantly reduced overloading (over 400 trucks were impounded during the first month of operation) and has also led to recommendations for strengthening existing road transport regulations and raising penalties (see Box 6.2). Road user involvement can thus play an important part in improving road management.

Box 6.1 Collecting International Transit Fees Under Contract

A recent report on harmonizing international transit fees, prepared by the PTA Secretariat and the SATCC Technical Unit, has recommended that these fees should, in the future, be paid by coupon. At present, they are paid in cash and many staff manning the border posts refuse to accept anything other than hard currency (i.e., travelers checks and PTA units of account are not accepted). Not only is this a security risk for drivers who must carry large sums of hard currency, there is ample evidence of widespread evasion and leakage. International vehicles stopped at weigh-bridges in Zambia are frequently found without receipts showing payment of transit fees (the driver uses part of the funds to pay off staff at the border post and then pockets the rest), and the actual collections remitted to the Ministry of Finance are well below their potential. In Zambia, collections fell sharply when responsibility for collecting international transit fees was transferred from British Petroleum (who collected them under contract) to the Customs Department. In Tanzania, the treasury only receives about $150,000 of the estimated $3.0 million that should be collected annually in transit fees.

To deal with this problem, the Federation of Regional Road Freight Associations, which includes representatives of the transport industries in Lesotho, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe, has resolved that a coupon system should be implemented in the region. To this end, the Federation of Zambian Road Hauliers (Fedhaul), has prepared a scheme to be piloted in Zambia, and a similar scheme is being introduced in Mozambique. The basic elements of the scheme are as follows:

- In the future, all transit fees will be paid by coupon. Coupons are printed in bank note quality — with watermarks and other security devices — and collecting agencies are issued equipment to detect counterfeits.
- Coupons will be issued through regional transporters associations who have indicated willingness to purchase quantities in bulk and distribute them to their members.
- Coupons consist of three parts which are used as follows: (i) stub retained by issuing authority (Fedhaul), (ii) part II retained by collecting agency at the border (border collection in Zambia will be carried out by one of the commercial banks which has branches at all border posts), and (iii) part III will be retained by the transporter as proof of payment and will be canceled on exit by the collecting agency as proof of payment (to ensure that vehicles which do not pay on entry do so on exit).
- The payment cycle involves four main steps: (i) transporter purchases the coupons for cash, (ii) driver hands the coupons to the collecting agency at the border post, (iii) collection agency returns the coupons to Fedhaul, and (iv) Fedhaul transfers the funds used to purchase the coupons into the road fund account.
- Fedhaul charges a 5 percent commission for its services, and it is expected that the commercial bank collecting coupons at the border will do the same. The costs of printing coupons is estimated at $200,000, and this will be financed through a commercial bank loan to be repaid from revenues over 3 years.

Annual revenues for Zambia alone are expected to exceed $1.8 million gross, or $1.6 million net of coupon printing and administration costs.

Box 6.2 Private Sector in Zambia Enforces Vehicle Weights and Dimensions Regulations

A recent 24 hour vehicle survey carried out in July 1993 by the Federation of Zambian Road Hauliers (Fedhaul) showed that there was widespread overloading (some vehicles carrying excess loads of 40 to 50 tons), minimal enforcement and that many of the overloaded vehicles passed the weigh bridges when they were closed. The current fine of 500 kwacha ($1.00 equivalent) was too low to act as a deterrent and the road traffic regulations were ambiguous and difficult to enforce. Following the survey, Fedhaul recommended that the legislation be amended to clarify the regulations and that a new penalty system be introduced.

The penalty system should cover incorrectly distributed loads and overloads. Their suggestion was that, when a vehicle exceeded the Gross Vehicle Mass, or axle weight, punitive fines should be imposed, starting at $50 for the first 1,000 kg overload and rising to a maximum fine of $10,000.

All Public Service Vehicles should carry written instructions from the operator detailing the amount of cargo to be loaded. If details on this document exceed legislated weight limits, the operator should be liable for the fine. If the shipper or forwarding agent has loaded cargo in excess of what is shown on the shipping document, the shipper or forwarding agent should be liable for the fine. If the vehicle is found to be carrying goods in excess of the manifested cargo and the operator's instructions, the driver of the vehicle should be liable for the fine.

Following the survey, the Ministry of Communications and Transport agreed to appoint *voluntary* road traffic commissioners, nominated by the organizations representing the road transport industry, to help enforce road transport regulations and, in particular, to supervise operation of weighbridges. The voluntary commissioners have powers to stop traffic, impound vehicles, and make arrests.

These arrangements are now in place, and over 400 trucks were impounded during the first month of operation in early 1994. However, since the new penalty structure is not yet in place, the Road Traffic Commissioners can only make vehicles off-load the excess, which must then be collected by another vehicle. This procedure has virtually eliminated the fourty to fifty tons of overload, but is not a sufficient deterrent. Fedhaul is therefore continuing to press for punitive fines.

The road transport organizations have willingly taken on the task of voluntary traffic commissioners because it protects the road pavement and reduces unfair competition, particularly from foreign vehicles operating on international transit routes.

6.2 GRASS ROOTS ORGANIZATIONS

Involving road users in management of roads cannot be done by simply involving them as individuals. Effective involvement requires individuals with a constituency, so that their participation creates a link between the road agency and a wider group of individuals with a vested interest in well managed roads. The individuals involved in management must act as spokespersons for larger grassroots organizations. Most countries posses a number of such organizations which operate at different levels as follows:

- *National, economy-wide organizations*: chambers of commerce, farmer organizations, consultant organizations, engineering societies, consumer groups, and women's organizations.

- *Local organizations:* village associations, parent-teachers associations, and other community groups.

- *Transport sector organizations:* transport institutions, transport training institutes, and transport consultative councils.

- *Road sector organizations:* roads associations (or federations), motoring organizations, trucking associations, taxi associations, and organizations representing bus owners and operators.

Those most relevant for establishing ownership in the road sector are chambers of commerce, farmer organizations, engineering institutions, roads associations (or federations), trucking associations, organizations representing bus owners, and other motoring organizations. Local community organizations and taxi associations are also relevant at the local level. All countries have chambers of commerce, most of which are usually well organized, take a keen interest in the state of the road network, and have a great deal of influence. Their involvement is essential. The roads boards in Tanzania and Zambia, the Board of Sierra Leone Roads Authority, and the Benin Road Fund Board all include representatives from their chambers of commerce. The South African Road Board also includes a representative of industry and commerce. Most countries also have farmer organizations. They tend to be well organized and influential, particularly when they represent large commercial farmers. The National Roads Board in Zambia includes a representative of farming interests.

Most countries have reasonably well organized engineering institutions (see Table 6.1). They usually act as leaders of opinion and are influential. Representatives from the engineering profession are members of road sector boards in Sierra Leone, South Africa, Tanzania, and Zambia. Africa also has a number of roads associations or federations. Since their members include consultants, contractors, and material suppliers, their numbers are likely to grow in line with increases in contract maintenance. They also tend to be well organized and effective. A representative from the roads association is a member of the Central Roads Board in Tanzania.

Coverage is more erratic when it comes to organizations representing vehicle owners and operators. There are a large number of general motoring organizations in Africa and representatives from these organizations are members of the roads boards in South Africa, Tanzania, and Zambia, and the president of the Driver's Association is a member of the Sierra Leone Roads Board. There are fewer organizations representing the road transport industry, although there is a representative of the road transport industry on the Roads Board in Zambia and on the Road Fund Board in Rwanda. Many countries either have no formal organization representing the road transport industry or have organizations which are moribund or ineffective. This is a serious weakness. It means that many countries have no formal mechanism for carrying on a dialogue with the most important road users, cannot effectively involve them in management of roads, and cannot work with them to strengthen axleweight enforcement or deal with other road sector issues. Establishing such organizations should be an important part of any agenda for strengthening the management and financing of roads.

Table 6.1 Organizations representing road users in selected SSA countries

Country	*Roads associations*[a]	*Trucking organizations*	*Bus owners and operators*	*Motoring associations*	*Engineering professions*
Benin	Yes	Yes	No	No	Yes
Cameroon	No	Yes	No	Yes	No
CAR	No	Yes	No	No	No
Kenya	No	Yes	Yes	Yes	Yes
Nigeria	Yes	Yes	Yes	Yes	Yes
Madagascar	Yes	Yes	n.a.	n.a.	n.a.
Rwanda	No	Yes	Yes	Yes	Yes
Sierra Leone	No	No	No	No	Yes
South Africa	Yes	Yes	Yes	Yes	Yes
Tanzania	Yes	No	No	Yes	Yes
Uganda	No	Yes	Yes	No	Yes
Zimbabwe	Yes	Yes	Yes	Yes	Yes
Zambia	No	Yes	Yes	Yes	Yes

n.a.: Not Applicable

a. Roads associations, or road federations mainly represent plant and materials suppliers and consultants.

6.3 WAYS OF INVOLVING ROAD USERS

There are several ways of involving road users in the management of roads. They can either be involved in overall management, management of parts of the road network (particularly at the local government level), or in specific aspects of management. Most countries invite outsiders to join steering committees, which guide consultants working on the road sector, or to sit on advisory boards, which review departmental research, training programs, design standards, and other technical matters. The outsiders often come from a university, although the steering committees, for important consultant studies, may include representatives from the road transport industry and other concerned organizations.

Another mechanism for involving road users, is the standard inter-ministerial steering committee (IMSC) which exists in many countries and is sometimes expanded to include road user representatives. A number of IMSCs were established under the RMI program and, although most simply coordinated preparations for a national road maintenance symposium, those in Tanzania, Uganda, and Zimbabwe evolved into something more substantive. The IMSC in Tanzania has evolved into an important policy review body serviced by a full-time RMI secretariat. At one stage there were plans to widen membership to include representatives of road users (and change the name to the National Steering Committee), but this was dropped after it had been decided to establish a Central Roads Board with road user representatives. In Uganda, the IMSC is chaired by the deputy prime minister and not only meets to review matters, but also makes decisions. The IMSC in Zimbabwe, which includes a representative from the Zimbabwe Roads Federation, has evolved into a steering committee overseeing an institutional study of the road sector. The IMSC in Zambia was also meant to evolve into a general policy review committee. It has fifteen members, just over half representing the private sector

(including the University of Zambia and the Chartered Institute of Transport), but unfortunately never meets.

Several countries in Africa have national road safety councils (or the equivalent) which include representatives from the private sector (see Table 6.2). The councils attempt to coordinate the activities of different organizations in the road safety field and may also advise the Transport Ministry on a wide range of matters related to road safety. Although most councils lack statutory powers, are underfunded, and do not have an effective secretariat — and hence are ineffective — others function quite well and serve as a useful body for involving the private sector in discussions on road safety. The National Road Safety Councils in Tanzania and Zambia are currently being restructured to improve their effectiveness.

Table 6.2 Institutions Involving Road Users in Management of Rroads in Selected SSA Countries

Country	*Central roads board*	*Regional roads boards*	*National road safety council*	*Inter-ministerial steering committee*[d]
Benin	Yes[a]	No	No	No
Cameroon	No	No	No	Yes
CAR	Yes[a]	No	Yes	Yes
Kenya	No	No	Yes	Yes
Madagascar	No	No	No	Yes
Mozambique	Yes[a]	No	No	No
Rwanda	Yes[a]	No	No	Yes
Sierra Leone	Yes	No	No	No
South Africa	Yes	No	Yes	No
Tanzania	Yes	Yes	Yes	Yes
Uganda	No	No	Yes	Yes
Ghana[b]	No	No	Yes	No
Nigeria	No	No	Yes	No
Zambia[c]	Yes	No	Yes	Yes
Zimbabwe[c]	No	No	Yes	Yes

a. Oversees management of the road fund.
b. The Board was suspended by the military government and is expected to be reinstated shortly.
c. These inter-ministerial steering committees include private sector members.
d. Only those in Tanzania, Uganda, and Zimbabwe meet regularly.

At the local level (i.e., in urban and rural district councils), governments are not very good at involving road users in the management of roads. The usual mechanism for doing so is through working committees which operate at the local government level. All urban and rural district councils have committees which deal with finance, planning and development, housing, and the other functions delegated to their level of government. Some also have roads and road transport committees which deal with roads, street cleaning, street lights, drainage, public transport, and traffic management. These committees often include nonelected members (e.g., the police) but rarely include representatives of road users or of the local community, other than those who happen to be elected members. However, representatives of such organizations are sometimes invited to attend and participate in the business of the committee. It is clearly

desirable to encourage the establishment of roads and road transport committees and the participation of road users in such committees, whether on a formal or informal basis.

At the national and regional level, road users are generally involved in the management of roads through road management boards. These are fairly common in Africa and there are at least eight functioning boards in Benin, CAR, Mozambique, Rwanda, Sierra Leone, South Africa, Tanzania, and Zambia. The Board of the Ghana Highway Authority, originally established in 1974 but suspended by the military government in 1981, is also about to be reinstated.[22] Tanzania also has Regional Roads Boards which operate at the regional level. The Boards in Benin, Rwanda, Sierra Leone, South Africa, Tanzania, and Zambia include private sector representatives (two, one, three, three, four, and seven respectively), while that in Mozambique is currently exploring ways of including private sector representatives. Ghana intends to have three private sector representatives when the Board is reinstated.

The South African Road Board is the oldest. It was originally established in 1935 and has had its membership (and functions) changed twice since then. It started off with six members, four representing the provinces and two appointed by the Minister of Interior. Although the Board was meant to function autonomously in the national interest, it quickly lapsed into gridlock because the provinces expected their representatives to promote provincial interests. In 1948 the Board was therefore replaced by one composed exclusively of civil servants. This worked better, although it led to a large freeway program (which critics claimed was excessive) and to the accumulation of a large surplus in the Road Fund (which contributed to its eventual closure). Finally, the present Board was established in 1988 with a much broader membership, which includes representatives of local government, the engineering profession, road users, and industry and commerce.

6.4 SETTING UP A ROADS BOARD

Several issues arise once it has been decided to establish a roads board. They concern the board's legal basis, its composition (including the choice of chairman), procedures for appointing board members, the role of the board, and board procedures. Each issue is examined below.

There are two ways of establishing a roads board. It can either be established under existing legislation (provided the legislation provides for appointment of a board) or under new legislation. The Central and Regional Roads Boards in Tanzania and the National Roads Board in Zambia were set up under existing legislation. The basic road legislation in most former British colonies permits establishment of roads boards to be established by notice from the minister. The basic legislation differs in each country and permits establishment of executive boards in Zambia, but only advisory boards in Tanzania.[23] Both Ghana and Sierra Leone could probably have established their boards under existing legislation, but wished to make a number

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22 They are not all called boards. Some are referred to as administrative councils or supervisory committees.

23 With appropriate membership, an advisory board can be influential and highly effective.

of changes to the basic road act at the same time and chose to pass new legislation. The other boards listed to in Table 6.2 were set up under new legislation. New legislation offers the best long-term solution, but does have disadvantages in the short-term. First, it requires parliamentary approval, and ministers are often reluctant to spend parliamentary time getting new legislation approved. Second, it involves formalizing a number of operating procedures without the benefit of hindsight. This has created major problems in Mozambique where the original wording of the decree makes it difficult to add private sector representatives, except as unpaid advisors. It is often better to get the board established under existing legislation, develop a set of operating procedures, and then formalize the procedures through legislation.

Box 6.3 summarizes the membership and characteristics of the boards in South Africa, Sierra Leone, Tanzania, and Zambia.[24] The composition of the board has a major impact on its effectiveness. There are three important elements: (i) choice of chairperson; (ii) membership of the board; and (iii) degree of flexibility in membership. It is not a good idea to have a chairman who is also head of the road agency (as in South Africa and Mozambique). When the director of roads is chairman, the board tends to be viewed as a lobby group arguing on behalf of the road agency, rather than as an impartial body acting on behalf of road users and the public as a whole. The chairman should ideally be a person of standing who can be expected to deal impartially with the business of the board. The boards in Sierra Leone, Tanzania, and Zambia all have strong, independent chairpersons and the Ghana Highway Authority intends to have a chairperson from the private sector when it reinstates its Board.

Membership is also important. A board composed wholly of civil servants tends to avoid difficult issues, concentrates on day-to-day administration of a given set of rules, and spends too little time on important policy matters. It is better to have a board representing a wide range of interests. The board generally needs to have a core of public sector representatives (from the ministries of finance, works or transport, and local government), but they should be complemented by other members representing road users, farming interests, industry and commerce, and the engineering profession. Sierra Leone probably has the neatest board structure. One-third of the board represents government, one-third road users (chamber of commerce, road transport industry, and the engineering profession), and the remainder are nominated by the minister (hence providing flexibility). The current chairperson is the retired headmistress of a major secondary school. Zambia has the most unusual arrangement. Seven of the eleven board members represent road users and other private sector interests, and the board chooses its own chairperson. It is worth noting that all boards have attempted to avoid having consultants and contractors as members, fearing that they might seek to use the board to pursue their own professional interests. This is an important point, since boards can easily become a lobby for their own special interests, rather than for those of road users.

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[24] The boards in Finland and New Zealand have a similar membership. In Finland, the director general of roads is chairman of the board, and members include representatives from the Ministry of Transport, the Ministry of Environment, municipalities, industry and commerce, road users (especially heavy vehicles) and two persons representing the road agency staff. The Transit New Zealand Authority has an independant chairman (a former local authority engineer), a deputy chairman (past president of the Institution of Professional Engineers), and six other members with experience in town planning, industry, local government, road transport (past president of the Automobile Association), farming, and accounting.

Box 6.3 Membership and Characteristics of Some Road Management Boards

South African Roads Board (SARB):

- The Board established under the 1988 Act, consists of a chairperson and seven members who are appointed by the Minister of Transport, Posts and Telecommunications.
- The director general, transport, is *ex officio* chairperson of the Board, and the deputy director general, transport, and the chief director, national roads, are also members of the Board. The remaining five members represent provincial road authorities, city councils, road users, the engineering profession, and industry and commerce. These members are appointed after consultation with their respective constituencies.
- The Board has two subcommittees. One, the Urban Transport and Planning Advisory Committee, reviews the transport plans prepared by the core cities of the metropolitan transport areas and makes recommendations on these plans to the Board. The other, the Toll Road Committee, advises the Board on all matters pertaining to toll roads.

Board of Sierra Leone Roads Authority (SLRA):

- The Board consists of a chairperson, the director general and nine other members. The Board, together with the director general and deputy director general, are appointed by the president.
- Board members include the head of the Ministry of Works, the financial secretary, representatives of the Chamber of Commerce, local government, and road users, a professional engineer of standing; and three other persons appointed by the president on the advice of the minister.
- The drector general and his deputy are assisted by five directors who are appointed by the Board.
- The director of administration acts as secretary to the Board.

Tanzania Central Roads Board (CRB):

- The Board consists of a chairperson and eleven members. The chairperson and one other member are appointed by the minister. The director of roads is also a member and acts as secretary of the Board. All other Board members are nominated by the organizations they represent.
- Board members include five representatives of principal secretaries (Works, Communications and Transport, Finance, Local Government, Home Affairs, and Planning Commission), four representatives of the private sector (Chamber of Commerce, Institution of Engineers, Roads Association, and Automobile Association), and one member appointed by the minister.
- The Board elects its own vice-chairperson.
- The Board has a full-time secretariat in the office of the director of roads.

Zambia National Roads Board (NRB):

- The Board consists of five *ex officio* members representing government ministries (Finance, Works and Supplies, Transport and Communications, Local Government, and National Commission for Development Planning) and seven members representing the private sector (Chamber of Commerce, road transport industry, Automobile Association, farmers, Institute of Engineers, Institute of Transport, Copperbelt University). All Board members are nominated by the organizations they represent
- The Board elects its own chairperson and vice chairperson,.
- The Board may have a core staff of up to five persons to deal with finance, planning, and inspection or auditing.

Finally, it is wise to allow for some flexibility in membership. This will enable the composition to evolve in line with changing road needs and, more importantly, provides a useful vehicle for resolving conflicts over membership. The inaugural meeting of the National Roads Board in Zambia was delayed for several months due to a disagreement over the organization

nominated to represent road users. This could have been avoided had it been possible to appoint one or more members "on the advice of the minister."

The way board members are appointed also influences their effectiveness. It is not simply a question of having someone on the Board who claims to speak on behalf of road users, like having a representative from the ministry of industry, or an acquaintance of the minister, who happens to run a trucking company. Such persons cannot, and do not, speak on behalf of the road transport industry. They have no constituency, no way of communicating with road users and cannot easily mobilize their support. The same applies to people representing concerned ministries. Unless they are senior persons with regular access to the permanent secretary, they will not really *represent* their ministry. Genuine ownership only occurs when the people selected to represent each constituency genuinely represent their members and have formal ways of communicating with them. Tanzania has attempted to address this concern by specifying that no ministry may be represented on the Central Roads Board by anyone below the level of director and requires the private sector agencies represented on the Board to nominate their own members. Zambia also invites the organizations represented on the Board to nominate their own members, while South Africa consults these organizations before appointing board members.

There is an important caveat to the above arrangements. Board members will only be effective if they spend sufficient time studying the business of the board and regularly consulting their constituents for guidance. In Zimbabwe, private sector members on several public boards have been ineffective because they did not spend enough time studying board matters. Board members should thus be paid an adequate allowance (to ensure they spend enough time preparing for board meetings) and should be required, as part of board membership, to consult their constituents before important board meetings. In Tanzania, board representatives from the Chamber of Commerce, Roads Association, Automobile Association, and Institution of Engineers, have been openly told that, as part of their function on the Board, they are expected to inform their members of the reasons for important Board decisions and of the Board's support for them.

The board also needs a clear role. This is usually spelled out in the legislation, or other parliamentary instrument establishing the board. The legal documents are usually supported by other instructions elaborating the general provisions of the legislation. These instructions need to cover the relationship between the board and the parent ministry, whether the board has executive powers or is merely advisory, its sources of finance (in the case of an executive Board), and its day-to-day responsibilities. Box 6.4 summarizes the duties laid down for the Board of the Sierra Leone Roads Authority and the Tanzania Central Roads Board. Box 6.5 summarizes the duties laid down for the roads boards in South Africa and Zambia. These legislated duties are normally supplemented through annual reporting arrangements that provide a formal vehicle through which the minister can amend or extend these duties.

Finally, there is the question of procedures. These are fairly standard but still need to be spelled out. They usually include the tenure of board members, payment of fees and expenses, secretarial arrangements, frequency of meetings, keeping of minutes (the board needs to meet at least once every three months; in Sierra Leone it meets more than once a month), accounting

arrangements (where relevant), submission of reports and their content, and auditing arrangements (where relevant). Reporting arrangements are particularly important since they act as a vehicle for keeping the parent ministry informed, enabling board members to report back to their constituents, and also help keep the public informed. The Sierra Leone Roads Board is required to submit an annual budget, annual statement of accounts (audited by independent auditors), and an annual report which includes information on Board policies and activities during the year. The Zambia National Roads Board has to prepare and publish the audited annual accounts of the Road Fund and also prepares quarterly and annual reports on the activities of the individual road agencies.

The key factors to be borne in mind when establishing a roads board are thus as follows:

- Decide whether the board is to have executive powers or act in an advisory capacity.
- If it is an executive board, it will usually require new legislation. Otherwise, it can often be established under existing legislation using simpler parliamentary procedures.
- Ensure that the board has an independent chairman of standing and has an adequate number of members representing road users and other persons with a vested interest in sound road management.
- Allow the organizations represented on the board to nominate their own members, pay adequate allowances, and require them to consult their constituents before important board meetings.
- Provide the board with clear terms of reference supported by a regular way of supplementing them through annual reporting procedures. Among other things, the terms of reference should spell out the relationship between the board and the parent ministry.
- Ensure that the board's rules and procedures are clearly spelled out, including the frequency of meetings and the content and timing of regular reports.

Box 6.4 Duties Laid Down for Road Boards in Sierra Leone and Tanzania

Board of Sierra Leone Roads Authority (SLRA)

The Authority was established on 19 March 1992 as a body corporate having perpetual succession and a common seal which may sue and be sued in its corporate name and hold and dispose of real or other property in any manner whatsoever for the purpose of carrying out the duties laid down in the act. The Board of the Authority has general control of the management, property, business, funds and of all other matters relating to the Authority. For the purposes of discharging its functions, the Board delegates to the Director General the following powers:

(i) To sign any contract for or on behalf of the Authority;
(ii) To collect any monies due to the Authority such as the monies from the Road Fund and Budgetary allocations and to discharge debts owed to the Authority;
(iii) To sign, accept, negotiate, endorse, and receive any negotiable instrument on behalf of the Authority;
(iv) To acquire or authorize the acquisition of any movable or immovable property and to transfer and or allocate any funds of the Authority for that purpose;
(v) To authorize the disposal of securities of any kind belonging to the Authority;
(vi) To open and operate current deposit or credit accounts on behalf of the Authority at any bank or financial institution; and
(vii) To negotiate and obtain loans on behalf of the Authority and to determine the nature and conditions of such loans.

Tanzania Central Roads Board (CRB)

The Board was established on 7 January 1994 as a body corporate which': (a) has perpetual succession and a common seal; (b) in its corporate name, is capable for suing and being sued; (c) is capable of purchasing and otherwise acquiring or alienating any movable or immovable property; (d) has power from time to time to exercise and perform such other powers and functions as are conferred by the minister. The function of the Board is generally to advise the minister (of Works, Communications and Transport) on matters pertaining to management and financing of roads, operation of the Road Fund, and any other matters which the minister may from time to time refer to the Board. Specifically and without prejudice to the generality of the foregoing, the Board shall:

(i) Advise the ministry on suitable management systems for roads;
(ii) Advise the ministry on issues of staff motivations;
(iii) Examine the operation of the Road Fund and advise the ministry on suitable arrangements for disbursement of adequate funds to end users;
(iv) Examine existing laws governing the operation and management of the road network and advise the ministry on necessary amendments.

The Board shall in the performance of its functions have regard to:

(i) Any general policies of the government notified to it by the minister; or
(ii) Any general or specific direction given by the minister.

In the performance of its functions, the Board is required to establish and maintain a system of coordination, cooperation and consultation with other bodies, within or outside Tanzania, which have similar or related functions.

Box 6.5 Duties Laid Down for Roads Boards in South Africa and Zambia

South African Roads Board (SARB)

The original National Road Board was established under the 1935 National Roads Act. The Act was amended under the 1948 Transport (Co-Ordination) Act, and the Board became the National Transport Commission (with wider responsibilities). Finally, this Act was amended under the 1988 South African Roads Board Act, which established the current South African Roads Board. The main purpose of the SARB is, subject to the provisions of the 1948 Act (as amended in 1988), to promote and encourage the development of transport in South Africa and, where necessary, to coordinate various phases of transport in order to achieve the maximum benefit and economy of transport services to the public. The main objectives of the Board are defined as follows:

(i) To design, build, and maintain a national network of freeways and other roads, including toll roads;
(ii) To compile a priority list of roads to be built or improved;
(iii) To design and build various special roads that are in the national interest;
(iv) To set geometric standards for the construction of national and special roads;
(v) To preserve the environment;
(vi) To expend available funds in the most cost effective manner in the provision of a primary road network;
(vii) To do or initiate research, whether in South Africa or elsewhere, in connection with the design, planning, or construction of roads;
(viii) To grant bursaries or subsidies to enable persons to study or do research on any subject in connection with roads;
(ix) To advise the minister, at his request, on questions relating to roads that may be raised by the government of any other country or territory;
(x) To provide rest and service areas, in conjunction with private enterprise, at strategic points on national roads in order to promote road safety.

The Department of Transport is charged with carrying out the executive and administrative work necessary to enable the SARB to carry out the duties and functions assigned to it.

Zambia National Roads Board (NRB)

The NRB was established through Statutory Instrument on 24 February 1994 under the Roads and Road Traffic Act. The order defines the functions of the Board as follows:

(i) To administer and manage the Road Fund;
(ii) To prepare and publish audited annual accounts of the Road Fund;
(iii) To recommend to the ministers (for Communications and Transport, Works and Supply and Local government and Housing) additional fuel levies and other road user charges as required;
(iv) To recommend projects for donor funding to the minister;
(v) To allocate resources for road maintenance and rehabilitation for various classes of roads as may be determined by the ministers;
(vi) To recommend funding for the development of new roads;
(vii) To provide guidance and technical assistance to various road agencies;
(viii) To receive and consider reports from road agencies on their activities and prepare quarterly and consolidated annual reports;
(ix) To prepare and award contracts, certification of payments, and advise the ministers accordingly;
(x) To review design standards and classification of roads and traffic sign for approval by the ministers;
(xi) To prepare and review terms of reference and guidelines for the various road authorities and budget guidelines;
(xii) To recommend to the ministers the granting of highway authorityship to any person or institution;
(xiii) To plan, manage, and coordinate the road network in the country;
(xiv) To review from time to time the status of road agencies and recommend appropriate action to the ministers, and make recommendations in relation to the siting of buildings on roadsides.

7 AN ADEQUATE AND STABLE FLOW OF FUNDS

This chapter deals with pricing and cost recovery policies for roads. It develops a model which attempts to promote economic efficiency and also to generate sufficient revenues to operate and maintain the road network on a sustainable long-term basis.[25] To do that, the model needs to influence the *demand* for travel — whether and how to make the journey — as well as the *supply* of road services. The impact on supply is particularly important.[26] The road agency should be discouraged from simply passing on to road users the costs of its own inefficiencies in the form of higher user charges. Instead, the financing mechanisms should: (i) encourage the road agency to use resources efficiently, (ii) limit the scope of the road network to what is affordable, and (iii) only construct new roads when resources are available for maintenance. In other words, the pricing and cost recovery policies should bring roads into the marketplace by defining a clear *price* for roads and, by linking revenues and expenditures, subjecting the road agency to a hard budget constraint to promote some form of *market discipline*.

This chapter addresses three key questions: (i) which instruments are available for charging road users? (ii) which principles should guide pricing and cost recovery policies? and (iii) how should the resulting revenues be managed?

7.1 CHOOSING A CLEAR MARKET SIGNAL

To influence demand and provide a basis for linking revenues and expenditures to create a hard budget constraint, charging instruments should be:

- Related to road use;
- Easily recognizable;
- Easy to separate from indirect taxes and other service charges or fees;
- Simple to administer (i.e., not subject to widespread evasion, avoidance, and leakage).

In addition, the instruments should be able to distinguish among paying for: (i) the right to use the road network, (ii) traveling over the roads, (iii) occupying road space (either by parking or causing congestion), and (iv) the benefits of road access.

7.1.1 Selecting Appropriate Charging Instruments

The main instruments used to charge road users include vehicle license fees, heavy vehicle license fees, levies on transport fuels and tolls and parking charges. Most of the other taxes and charges paid by road users are either general revenue taxes (see Box 3.1 for an explanation of how to separate road user charges from general tax revenues), or service fees levied in connection with the provision of specific services (e.g., registration fees, driving license

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25 In Africa, where virtually all governments are critically short of fiscal revenues, improved cost recovery is more important than improved demand management.

26 This emphasis is to counteract the standard presumption made by economic theory that public sector production is efficient and that costs, including marginal costs, are minimized (see Kranton 1990).

fees, etc.).[27] The characteristics of the available charging instruments are compared in Table 7.1. The table suggests that the instruments best suited to Africa are vehicle license fees, heavy vehicle license fees, fuel levies, and international transit fees. Parking charges are less suitable as presently collected, because they are generally treated as yet another tax and this makes them difficult to administer (i.e., they suffer from high levels of avoidance and leakage).[28] However, if collected under contract, they could play an important role in helping to generate revenues and manage urban traffic. The other technically sound charging instruments, tolls, and weight-distance fees, are less suitable. Few roads in Africa carry sufficient traffic to make tolling economic, and weight-distance fees are difficult to administer (see Box 7.1 for a description of weight-distance fees). The advantage of weight-distance fees is that they encourage the use of vehicles with axle configurations which do less damage to the road pavement. They also make it easier to charge for roads when there is rampant fuel smuggling and, particularly if introduced on a regional basis, make it easier to charge international truck traffic. Weight-distance fees should therefore be considered as soon as a country has developed the capacity to administer them.

The actual charging instruments used in Africa are listed in Table 7.2. The table shows that most countries use vehicle license fees (usually based on gross vehicle weights or engine capacity), a few use license fees based on axle weights (Chad) or have a heavy vehicle license fee (CAR and Zimbabwe), a surprising number use fuel levies, and a number also use international transit fees. Several countries also charge ferry and bridge tolls. These charges offer the potential for being used as a two-part *road tariff*. The license fees can be used to charge for *access* to the road network, while the fuel levies can be used to charge for *use* of the road network. Fuel consumption is not exactly related to variable road maintenance costs, but is closely enough related for practical charging purposes (see Figure 7.1). In terms of revenues raised, fuel levies are by far the most important user charges currently used (see Figure 7.2).

7.1.2 Administrative Considerations

It is important to ensure that the above fees, fuel levies and, where applicable, bridge and road tolls are administered efficiently. This means minimizing evasion, avoidance, and leakage; avoiding inadvertent subsidies; ensuring that the fuel levy does not inadvertently tax non transport users of diesel; and minimizing fuel price distortions.

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27 Service fees cover the costs of establishing title to property (to facilitate law enforcement), checking vehicles for mechanical soundness and monitoring payment of license fees. As such, they are not user charges and should be set to only cover servicing costs.

28 Experience with parking charges is not encouraging. During 1991 Nairobi earned $17,500 from car parks and parking meters, but it cost $82,000 to operate and maintain these facilities.

Table 7.1 Administrative Characteristics of Different Road User Charging Instruments

					Administrative characteristics			
Charging instrument	*Potential role*	*Related to road use*	*Separable from general taxes*	*Easily recognizable*	*Collection cost (percent)*	*Avoidance or evasion*	*Ease of collecting by contract*	*Suitability for Africa* [d]
Tolls	user fee	yes	yes	excellent	10-20	moderate	simple	low
Vehicle license fee	vehicle access fee	no	yes	good	10-12	high	moderate	high
Heavy vehicle license fee	vehicle access fee	not directly	yes	good	unknown	unknown	simple	high
Fuel levy	user fee	partly	can be	good	negligible	low	simple	high
Weight-distance fee [a]	user fee	yes	yes	excellent	5	moderate	moderate	low
International transit fee	foreign user fee	should be	yes	good	10	high	simple	high
Parking charges [b]	control access	partly	yes	good	over 50	high	simple	low
Cordon charge [c]	congestion charge	partly	yes	moderate	10-15	unknown	simple	moderate
Area license	congestion charge	partly	yes	moderate	10-15	unknown	simple	moderate
Electronic road pricing	user or congestion charge	can be	yes	good	less than 10	unknown	simple	low

a. A simpler form of weight-distance fee is the vehicle-km fee. It employs the same basic principles, but relates fees more simply to vehicle type and distance.
b. These are difficult to administer in Africa and currently generate little revenue.
c. These are only suitable when the road network lends itself to cordon pricing.
d. This defines their suitability as *general* charging instruments.

Source: Heggie, 1992

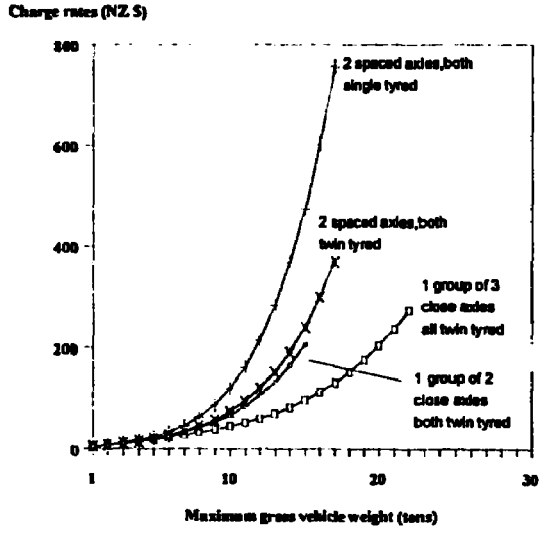
Box 7.1 Weight-Distance Fees for Diesel Vehicles

New Zealand, Iceland, Norway, and Sweden all use weight-distance fees to charge diesel vehicles for usage of roads, and Canada is planning to introduce them in the near future. The basic principle is that all diesel vehicles must buy a license (in New Zealand they are issued in multiples of 1,000 km) graduated according to axle configuration and gross vehicle weight. The charges are administered through sealed hub odometers or other certified distance meters. The charge is lower for vehicles with multiple axles and increases with gross vehicle weight (see figures below).

The charging system is best developed in Iceland and New Zealand. The weight-distance fee is administered separately from the general tax system and all revenues collected from the sale of weight-distance licenses are paid into a special account set aside to support spending on roads. The systems in Norway and Sweden are similar, except that revenues are not paid into a special account. In addition to the weight-distance fees, Iceland and New Zealand also levy a special fuel charge on gasoline to charge gasoline-powered vehicles. The revenues from this charge are also paid into the special account. Norway and Sweden do not levy specific charges for gasoline-powered vehicles and treat all revenues as general tax revenues.

Weight-distance fees can be difficult to administer. There is considerable scope for evasion — mainly by under-buying and avoiding detection — unless the sale of licenses can be checked for consistency and linked to an active enforcement program. In New Zealand it is estimated that collection and enforcement absorbs about 5 percent of gross revenues and that evasion varies from 10 to 20 percent. The system should work satisfactorily when it is effectively administered — with fees perhaps being collected under contract — and vigorously enforced. It should be possible to administer weight-distance fees in countries like Botswana, South Africa, and Zimbabwe.

Trailers



Rigid Vehicles

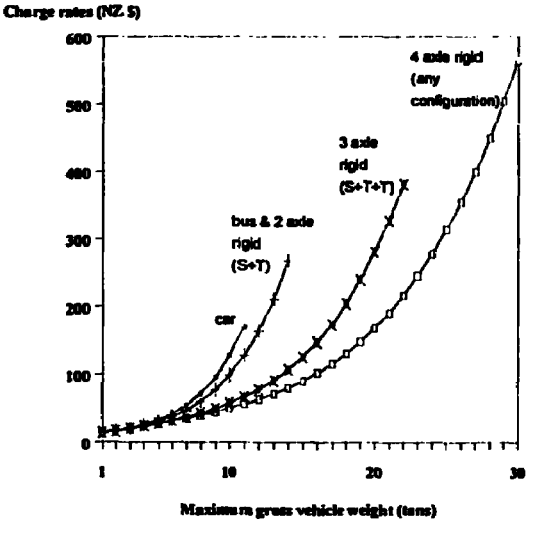


Table 7.1 shows that: (i) license fees suffer from wide-spread evasion, (ii) international transit fees suffer from serious leakage (this is aggravated by the fact that they are usually paid in foreign exchange), and (iii) road and bridge tolls suffer from high levels of evasion and leakage and are costly to administer. In some countries, half of the vehicles often go unlicensed and uninsured (e.g., Zambia), revenues from international transit fees are less than half their potential (e.g., Tanzania), and the costs of administering road and bridge tolls is higher than the revenues collected (e.g., Ghana). To minimize avoidance and evasion and improve the effectiveness of

road user charging instruments, governments are attempting to improve revenue administration. There are two main options. The first is to simplify the fee structure to reduce avoidance, and mobilize most license fee revenues through a heavy vehicle license fee. Since there are fewer heavy vehicles (perhaps 20 percent of the total), and they are mostly owned by registered businesses, a heavy vehicle license fee is easier to administer. Both Tanzania and Zambia are considering this option. The second is to collect more fees under contract with the private sector. Mozambique is in the proces of subcontracting the collection of international transit fees to a commercial bank and Zambia is proposing to use a similar contractual arrangement (see Chapter 6, Box 6.1).

Table 7.2 Charging Instruments Currently Used in Sub Saharan Africa

Country	*License fees*	*Heavy vehicle fee*	*Fuel levy*	*International transit fee*	*Other charges*
Tanzania	Yes	No [a]	Yes	Yes [b]	Various levies and duties from motor vehicles are supposed to be paid into the road fund
Benin	No	Yes [c]	Yes	Yes	Bridge tolls, import duties, value-added tax
Mozambique	Yes, at provincial levels	No	Yes	Yes [b]	Bridge tolls
Nigeria	Yes, at state levels	No	No	Yes	Bridge and road tolls
Sierra Leone	Yes [d]	No	Yes	No	-
Zambia	Yes	No [a]	Yes	Yes [b]	-
Ghana	No	No	Yes	No	Bridge and road tolls. The fuel levy applies to all fuels
CAR	No	Yes	Yes	No	Bridge and ferry tolls
Rwanda	No	No	Yes	No	Road tolls
Kenya	Yes	No	Yes [c]	Yes [b]	Road tolls
Uganda	Yes	No	Yes [c]	Yes [b]	Road tolls
Zimbabwe	Yes, by local authorities	Yes	No	Yes [b]	-
Chad	No	Axle-weight tax	Yes	Yes	Ferry and road tolls

Note: - Data were not available
a. Under consideration.
b. Fees are collected under the Preferential Trade Area (PTA) agreement.
c. Weigh-bridge fees.
d. Provisions exist for collecting license fees, but they are not allocated for spending on roads.

Source: World Bank project reports

Figure 7-1 Relationship between Variable Road Maintenance Costs and Costs of a Fuel Levy

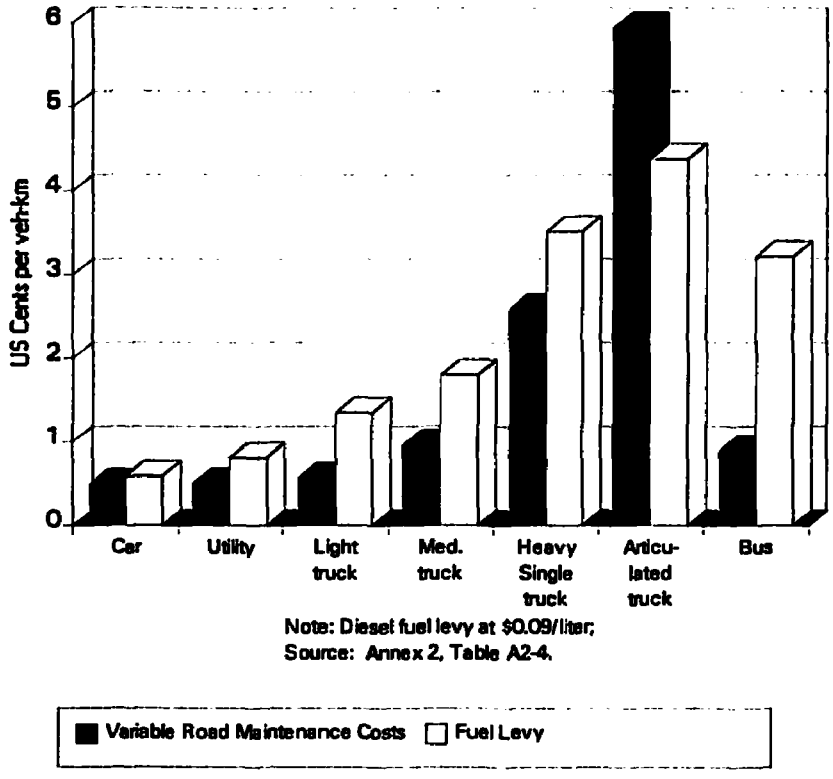
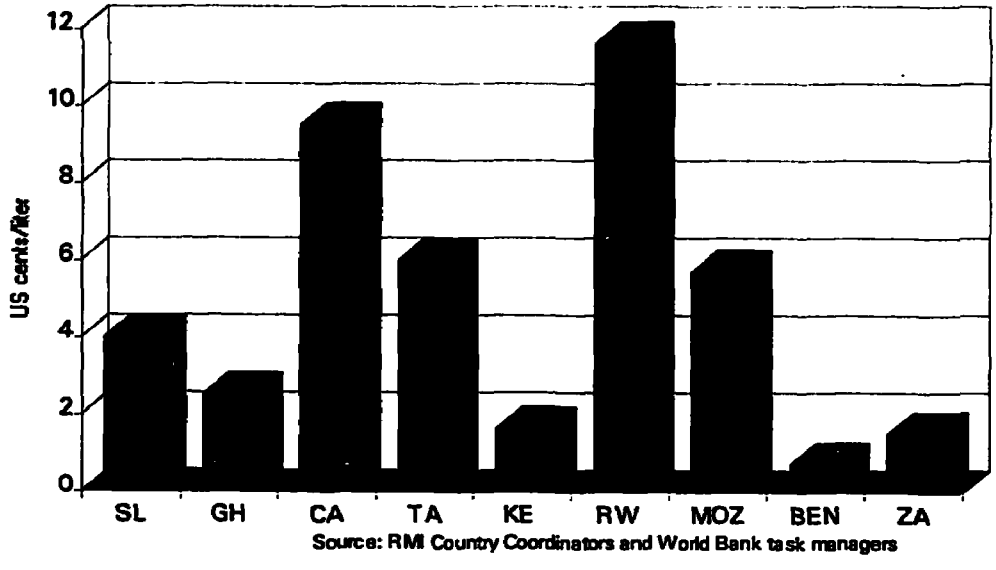


Figure 7-2 Fuel Levies Paid into Road Funds
(11 January, 1994 after the devaluation of the CFAF)



Administrative arrangements may also lead to inadvertent subsidies. Vehicles owned by the government rarely pay license fees and government and diplomatic vehicles often pay no fuel levies. These vehicles nevertheless impose measurable costs on the road network and someone, usually other road users, have to pay these costs. This creates distortions. To avoid this, all road

users should pay license fees and fuel levies, or the government should reimburse the road agency for loss of revenue caused by exemptions. A subsidy also occurs when the pump price of fuel (excluding the fuel levy) is lower than its *border price* (see Box 7.2 for a description of how to compute the relevant border price of fuel). When that occurs, the fuel levy does not generate additional net revenues. It simply reduces the implicit subsidy channeled to the road sector. To avoid this, the government should ensure that pump prices are higher than border prices and should ideally take full advantage of the low price elasticity of demand for fuel by imposing higher taxes on fuel than on general consumption goods (see Box 7.3). Of course the opposite can also happen. Pump prices may be too high because tax levels are higher than the optimum, as was thought to be the case in some West African countries before the CFAF devaluation, or because of inefficient petroleum procurement and distribution policies.[29]

One of the most difficult administrative issues is to ensure that non-transport users of diesel fuel do not pay the fuel levy. As much as a third of diesel fuel is used outside the transport sector for power generation and to operate heavy equipment in the construction, agriculture, and mining sectors. Few countries in Africa have managed to solve this problem. However, some countries (like Chad) already differentiate in their tax structures and apply different tax rates to automotive diesel, industrial diesel, and diesel for power generation (in Chad the rates are CFAF 127, 82, and 46 respectively). In principle, differentiation is therefore possible. Other countries operate rebate schemes or offer exemptions. CAR exempts river transport and power generation, Ghana exempts the fishing industry, and Mozambique has introduced an arrangement under which 20 percent of the diesel fuel levy is set aside to compensate agriculture for having to pay the fuel levy. There are therefore a number of ways to ensure that the diesel fuel levy is effectively only paid by road users. Most countries have nevertheless decided that the administrative complexities outweigh the advantage of these options.

The final administrative concern relates to relative fuel price distortions. Fuel levies raise fuel prices and this may encourage substitution between different transport fuels. The biggest problem arises with kerosene. Some governments keep kerosene prices low to minimize the impact on low-income households which use it for cooking and lighting. They also keep kerosene prices low to encourage substitution of kerosene for fuelwood to reduce deforestation. Kerosene can be mixed with either gasoline or diesel fuel and, when mixed with a little engine oil, can even be used as a complete substitute for diesel fuel. A high price differential between diesel and kerosene will thus encourage substitution, and the fuel levy will then not realize its full potential. The only ways to discourage substitution are by coloring kerosene and inspecting vehicles for mixing (as is done in Zambia) or by issuing coupons to poor households for the purchase of kerosene at concessionary rates. Neither solution is entirely satisfactory. The best option is to avoid wide price differentials between kerosene and diesel fuel.

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[29] A recent survey has estimated that Sub-Saharan Africa could save about $1.4 billion a year at 1989/90 prices by rationalizing the supply of petroleum products. About half the potential savings would come from improved procurement arrangements, which would cut costs and, more importantly, reduce gratification payments. Another 40 percent would come from improved refining practices, while the final 10 percent would come from improved distribution and storage arrangements. (See Schloss, 1993).

Box 7.2 The Border Price of Transport Fuels

Border prices measure the cheapest way to procure transport fuels. There are three main cases to be considered, countries which: (i) import refined fuel products, (ii) import crude petroleum and refine it in a domestic refinery (or pay a fee to have it refined in another country), or (iii) produce crude petroleum and refine it in a domestic refinery.

The method of calculating border prices is the same in all three cases. For case (i), the starting point is the f.o.b. price at the originating port, while for cases (ii) and (iii), it is the f.o.b. price at the most efficient, available, originating port (usually Bahrain, Curacao, Rotterdam, or Singapore). The reason for choosing the most efficient available originating port is to ensure that the costs of an inefficient local refinery, or inflated production costs, are not passed on to users as part of the border price, but are clearly recognized as an implicit subsidy to the refinery or local producer. Insurance and freight costs are then added to the f.o.b. price to produce the c.i.f. price. Alternatively the calculation can start directly with the c.i.f. price, which is readily available for most countries from the World Bank's quarterly report on Prices of Crude Petroleum and Petroleum Products. Finally, allowance is made for ocean losses, port charges, and transport costs (if any) from the port to the customs border. The sum of these costs represents the import parity, or border price of fuel.

The table shows how border prices were calculated for Botswana, a landlocked country, in January 1983. The final estimates for the border prices of premium gasoline, diesel fuel, and kerosene were $0.31, $0.29, and $0.34 per liter, respectively. Comparable figures for Nigeria, an oil producing country, were $0.32, $0.26, and $0.28 per liter in April 1983, excluding inland transport costs.

Border Prices of Transport Fuels: Botswana, January 1983
(US. cents per liter)

	Premium gasoline	*Diesel fuel*	*Kerosene*
f.o.b. Price	21.74	21.78	23.88
Freight Charges	1.60	1.81	1.70
Insurance Costs	0.02	0.02	0.03
c.i.f. Price	23.36	23.61	25.61
Ocean Losses	0.07	0.07	0.08
Landing and Wharfage	0.39	0.39	0.43
Coastal Storage	0.35	0.35	0.35
Rail to Gaberone	7.18	4.86	7.36
Import Parity Gaberone	31.36	29.28	33.82

Source: Botswana: Issues and options in the Energy Sector, Report No. 4998-BT, UNDP/World Bank Energy Assessment Program, World Bank, Washington, 1984.

7.1.3 Fuel Smuggling

Fuel levies break down when there is rampant fuel smuggling. This is a major problem in parts of East and West Africa where the low price of diesel in some countries has led to massive fuel smuggling. It is estimated that during 1992 one-quarter to one-half of the fuel consumed in Cameroon and Benin was smuggled from Nigeria. This makes it virtually impossible to finance roads through fuel levies. Indeed, it makes it virtually impossible for governments to mobilize any revenues by taxing imported fuels (in Africa, fuel taxes account for up to one-third of the government's total tax revenues).

Box 7.3 Strengthening Revenue Mobilization by Improving Taxation of Transport Fuels

Fuel prices in Sub-Saharan Africa are currently well below those in other parts of the world and are also lower than they were in francophone countries before the recent CFAF devaluation. Several countries have negligible tax rates (i.e., the pump price is at or close to the border price), while others simply apply standard consumption tax rates to fuel.

Little effort has been made, other than in francophone West Africa prior to the CFAF devaluation, to improve domestic revenue mobilization by having higher taxes on fuel than on other commodities. This contrasts starkly with practice in other parts of the world where fuel taxes are generally significantly higher than general consumption taxes. A recent survey of selected Organization for Economic Cooperation and Development (OECD) countries has shown that gross tax rates on leaded gasoline during 1990 and 1991 were between 60 and 70 percent (75 percent in France), leading to net tax rates of 150 to 230 percent (the gross tax rate = net tax rate/[1 + net tax rate], where tax rates are measured in percent). This was three to five times higher than the general consumption taxes in these countries. Furthermore, the available evidence on the price elasticity of demand for gasoline suggests that these differentials are justified from an economic efficiency point of view (i.e., the higher rates move the taxation system closer to the optimum).

Since gross consumption tax rates in Africa are about 15 percent, gross petroleum tax rates might be expected to be between 45 and 75 percent to be economically efficient. This would result in net tax rates of 120 to 300 percent. In other words, if the base price of gasoline was 25 cents per liter, the fuel tax would be between 30 and 75 cents per liter. This is far higher than existing gasoline taxes in most Sub-Saharan African countries. Most Sub-Saharan African countries could therefore *improve* domestic revenue mobilization *and* reduce the welfare costs of taxation by raising fuel taxes and lowering other general consumption taxes.

There is no easy way around this problem. Wide disparities in price lead to large potential profits and hence to widespread bribery and corruption. Attempts to prevent smuggling cannot therefore rely on enforcement alone. Three alternatives currently being tried include: (i) making the currency nonconvertible to make the sale of smuggled fuel more difficult, (ii) introducing network-wide road tolls in lieu of the fuel levy, and (iii) promoting harmonization of fuel prices under regional trading agreements. Convertibility has been suspended in Cameroon and Benin, and Cameroon has introduced road tolls over the entire main road network (the tolls were not primarily intended to discourage smuggling). However, introduction of network-wide road tolls is a strategy of despair. Unless the system is carefully designed and administered in collaboration with the road transport industry, it will not generate much revenue and will also face public hostility. It is estimated that Cameroon loses up to 75 percent of its potential toll revenue through evasion and leakage. However, with strong support from the road transport industry, which has a vested interest in generating funds for road maintenance, a road toll system might just work.

7.2 PRICING AND COST RECOVERY POLICIES

This section sets down the basic principles which guide pricing and cost recovery policies for roads. It focuses on ways of recovering the costs of maintaining, improving, and rehabilitating the road network and on ways of using congestion charges (where relevant) to ration scarce road space. It does not deal with the costs of other externalities, since the government should handle these directly through regulations and corrective taxes, which may take the form of an additional *environmental* levy added to the price of transport fuels. The pricing and cost-recovery policies discussed in this chapter have four objectives: (i) to provide the correct market signals to road users, (ii) to ensure road agencies use resources efficiently, (iii) to constrain the size and quality of the road network to what is affordable, and (iv) to

generate sufficient revenues to operate and maintain the *core* road network on a sustainable long-term basis. The policies must therefore balance several conflicting objectives. The following sections deal first with the basic principles and the practical problems encountered when trying to implement them, the way in which maintenance, new construction, and rehabilitation are financed, and how to use pricing policies to help manage urban road congestion.

7.2.1 Basic Principles

To maximize net economic benefits, road user charges should be set equal to the costs of the resources consumed when using the road network. These costs are generally referred to as short-run marginal costs (SRMCs). There are two costs to be considered: (i) the damage done to the road surface by the passage of vehicles (i.e., the variable costs of operating and maintaining the road network), and (ii) the additional costs which each road user imposes on other road users and on the rest of society (i.e., the costs of road congestion and other externalities). Congestion is the classic source of external disbenefit in the road sector and is the one normally taken into account when estimating the optimal user charge.[30] However, since less than half the costs of operating and maintaining the road network vary with traffic (see Table 7.3) — and roads in Africa do not experience widespread and persistent road congestion — prices set equal to SRMCs will result in large financial deficits. Furthermore, since most governments in Africa are acutely short of fiscal revenues, it is rarely possible for them to finance these deficits through general taxation. The funds are simply not available.

How should these deficits be financed? The obvious target are the road users themselves, and in the case of local access roads, also those who benefit from road access. They use the roads, or benefit from them, and might be expected to pay for them. Furthermore, there is a *prima facie* case for supposing that the welfare costs of raising most of the required revenues from road users are lower than the costs of mobilizing them through general tax revenues. There are also distributional arguments in favor of raising most of these revenues from road users. Road users are among the wealthiest members of society and, although the poor depend heavily on public transport for jobsearching and gaining access to public services, it is better to assist such persons by subsidizing selected transport *services* or by providing other forms of income support. Therefore, unless there are reasons to the contrary, there are strong arguments in favor of financing these deficits from road users and those who benefit from road access.

The idea of going for full cost recovery is also consistent with the desire to link revenues and expenditures to subject the road agency to a hard budget constraint. If some costs are financed by others, whether by way of subsidies or other transfer payments, it weakens market discipline. Pressure to keep costs under control — and only undertake expenditures for which users are willing to pay — requires a clear market signal which makes road users recognize the full costs of providing road services. The road tariff should therefore reflect the costs of operating and maintaining the road network and increased road spending should automatically raise the road tariff (although it will usually reduce VOCs). Imposition of a hard budget constraint thus requires full cost recovery from road users and, in the case of local access roads, both road users and the beneficiaries of road access.

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30 External disbenefits also include the road damage externality. Each vehicle damages the road pavement and this increases the VOCs of all subsequent vehicles which use the road. However, if the road network has a fairly uniform age distribution, and if maintenance policies are condition-responsive, road damage externalities are zero when traffic growth is zero and all road damage is caused by vehicles, and is negligible in all other reasonable cases. (See Newbery, Hughes, Paterson, and Bennathan, 1988).

Table 7.3 Costs of Road Maintenance on Different Types of Road
(US cents per veh-km)

	Main roads		*Local access roads*		
			Paved roads	*Unpaved roads*	
	Minor arterial	*Collector or arterial*	*High volume*	*High volume*	*Low volume*
Traffic (AADT)	3,000	1,000	300	300	50
Pavement SNC[a]	5	3	2	2	-
Normal loading (8 ton limit), high motorization (20% trucks)					
Variable costs	0.28	0.53	0.65	-	-
Fixed costs	0.29	0.84	2.40	-	-
Total	0.57	1.37	3.05	-	-
Normal loading (8 ton limit), low motorization (70% trucks)					
Variable costs	0.50	1.01	1.92	1.92	3.01
Fixed costs	0.32	0.92	2.68	0.91	5.48
Total	0.82	1.93	4.60	2.83	8.49

Notes: - Not applicable
Based on data from a selection of developing countries that do not have any extremes of climate.
US cents per veh-km is the average cost for all vehicles.
a. Modified structural number of the road pavement.

Source: Paterson and Archando-Callao, 1991.

This leads to three basic pricing and cost recovery policies:

- Never set the road tariff lower than the variable costs of operating and maintaining the road network;
- Ensure that the road tariff and the taxes and charges used to support local access roads collectively cover all road costs;
- When there is significant road congestion, the road tariff should also include congestion costs, although this will only apply to a handful of seriously congested cities.

7.2.2 Practical Considerations

There are three main practical problems. First, the variable costs of maintaining different types of roads vary significantly. Table 7.3 shows that they vary from about 0.3 US cents to 0.7 cents per veh-km on the main network, to 0.5 cents to 0.7 cents per veh-km on the urban network and to 1.9 cents to 3.0 cents per veh-km on the rural road network. Total costs likewise vary from a low of 0.6 cents per veh-km on the main network to a high of 8.5 cents per veh-km on the rural road network. Charges based strictly on costs would thus involve wide differentials between different types of roads and different road agencies. This is simply not practicable, although it is possible to maintain some differential between urban and rural areas and among different regions. A practical set of user charges will thus involve a great deal of averaging.[31]

Second, the variable costs of maintaining the road network also vary significantly between different types of vehicle (see Figure 7.1). Cars impose relatively small costs on the road network, while articulated trucks impose costs twelve times larger. In principle, an articulated truck should therefore pay twelve times more than a car. However, if the main charging instrument is a fuel levy it will only pay six or seven times more (an articulated truck uses about seven times as much fuel as a diesel car). The available charging instruments therefore introduce further averaging that can only be avoided by switching to weight-distance fees, which can be accurately calibrated to reflect underlying road-use costs.

The final practical problem relates to the way license fees and the fuel levy are set to ensure that: (i) to the extent feasible, each class of vehicle covers the variable costs it imposes on the road network, and (ii) the road tariff and the taxes and charges used to support local access roads collectively cover all road costs. The fuel levy by itself would undercharge articulated trucks and overcharge other vehicles, particularly buses. The license fee must therefore be used to compensate for this. In other words, the license fee cannot be strictly used as an access fee set to cover fixed costs. The available pricing instruments are too blunt for that. Instead, the combined license fee and fuel levy have to be set to meet the above two objectives. This then results, not in a strict two-part tariff, but in a *quasi two part tariff*. Clearly, there is no scope with these charging instruments for using the inverse elasticity rule (i.e., Ramsey pricing), although it would be applicable when using weight-distance fees (see Annex 2 for a description of the inverse elasticity rule). Annexes 3 and 4 provide an example illustrating how to estimate the above two-part tariff.

7.2.3 Financing Maintenance

The above model suggests that: (i) the costs of operating and maintaining the interurban road network should be financed through the road tariff, (ii) in urban and rural areas, the *variable* costs of operating and maintaining the road network should also be financed through the road tariff, and (iii) the *balance* of the required expenditures in urban and rural areas should be financed from local revenues. These local revenues may come from parking charges (in large urban areas), local property taxes, head taxes, market taxes, or product taxes (in Kenya, service charges on tea and other products provide local revenues to support road maintenance). In

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[31] This is true in many sectors. In the case of electricity, the costs of generating the base load are estimated by pooling the costs of individual power stations and calculating the average variable and fixed costs for the entire group. The variable costs of a hydro-power station (which are virtually zero) are thus pooled with those of coal, oil, and gas-fired stations and also with stations of different age.

Zambia, the basic road legislation permits the minister to impose taxes on adjoining property owners to finance the costs of branch and estate roads. In rural areas and urban squatter settlements, the local community sometimes contributes materials and/or volunteer labor in lieu of such taxes.

One of the key features of the above financing arrangement is that it focuses attention on the *affordability* of a fully-funded road maintenance program and hence on the need to define a *core* road network which users are willing and able to fully finance. Most African countries are now having to face this issue. Road networks were expanded too rapidly during the 1960s and 1970s, and governments are no longer able to fully maintain the entire road network. Instead, they are being forced to define a core network which they can afford to maintain. Noncore roads either receive minimal maintenance or are handed over to lower levels of government. In Tanzania, this has resulted in a decision to fully maintain all main and regional roads in good and fair condition (about two-thirds of the total) and to carry out emergency and spot maintenance on only about 20 percent of the remaining third in poor condition. CAR has defined a core network, amounting to less than 20 percent of the total, which they intend to fully maintain, while Benin has effectively handed over maintenance of most rural roads to local communities.

7.2.4 Financing New Investment

New investments include road improvements (e.g., surfacing an earth track), extending the road network (e.g., constructing an agricultural penetration track), and expanding road capacity (e.g., widening a road). There are sound economic reasons for wanting to finance improvement and extension of the road network by applying the *benefit principle* of taxation: those who benefit should pay. There are also sound economic reasons for wanting to finance increased road capacity on congested roads through congestion charges. However, the bluntness of the available charging instruments makes it virtually impossible to confine charges to beneficiaries, or to administer congestion charges on the interurban and rural road networks (urban road congestion is dealt with in section 7.2.6). The choice of financing instruments thus comes down to charging all road users, or financing investments from general taxes channeled through the government's development budget.

People have strong views on how to finance investment. Many believe the road tariff should only finance operation and maintenance and that all new investment should be financed through the development budget. Otherwise there is a danger that new construction might take precedence over maintenance or that the road agency might undertake too much investment. Major new investments in the interurban road network, furthermore, have major impacts on landuse, location of industry, and property values. This raises both strategic and political issues which should properly be dealt with by the government. There is some evidence to support this view. During the 1980s, countries like Tanzania and Zambia continued to build new roads at the expense of maintenance. On the other hand, there are also arguments in favor of financing new investment through the road tariff. Only by forcing road users to pay the full costs of using the road network — including the costs of investment — will the size of the network be constrained to what is affordable and will essential investments be carried out regardless of the state of the government's budget.

There is no simple answer. Some countries finance new investments through the development budget (including Mozambique, Tanzania, and Ghana), while others finance some investment through user charges (including Benin, CAR and, until recently, South Africa). It is

really a question of governance. In countries where new investments are frequently undertaken for political reasons and where the roads board (if any) is unable to stand up to these political pressures, new investments should be financed through the development budget. Where there are strong, representative roads boards which are able to withstand political pressure, it may be better to finance new investments through the road tariff. This will ensure that they are subjected to the test of the marketplace. The board should also ensure that new investment does not displace maintenance.

Slightly different considerations apply in the case of urban and rural district roads. In the case of new investment, the overriding objective is to ensure that districts only undertake priority projects, rather than undertake new investments because the funds are provided as a grant channeled through the government's development budget. This argues in favor of a matching-grant system. The district has to demonstrate the priority of its investment program by paying part of the costs from its own local revenues. The local revenues can come from land-value increment taxes (i.e., betterment taxes and frontage levies) or other forms of property tax. The balance of the expenditures are then financed by the road tariff or through the government's development budget. The amount financed by the district should clearly be based on the ability to pay.

7.2.5 Financing Road Rehabilitation

Most countries have large backlogs of deferred maintenance. Governments are furthermore short of fiscal revenues and are generally unable to finance much road rehabilitation from their own resources. So where will funds come from? The first thing to recognize is that Africa cannot afford to rehabilitate *all* roads in poor condition. The best it can hope for is to rehabilitate a core network which the country can afford to maintain on a sustainable long-term basis (see section 7.2.3 above). The remaining roads in poor condition will either have to receive minimal maintenance or be handed over to lower levels of government and local communities. However, even rehabilitation of the core road network will still cost an estimated $1.5 billion per year over the next ten years. There are three possible ways of financing this: (i) by reallocating existing spending from new construction, (ii) through donor-financed loans and grants, and (iii) through the road tariff.

The first option offers little hope. Few African countries have large construction programs — other than those financed by donors — so there is limited scope for reallocating domestic resources from construction to rehabilitation. The second option, donor financing, is already being used, with donors currently financing about $800 million of rehabilitation per year. This money is, however, not free. True, some comes in the form of grants and some comes in the form of concessionary loans, but governments still have to service the loans. Somebody has to pay. In the short term, most governments are doing this from general revenues. In other words, other sectors are being taxed to finance road rehabilitation programs. This is not sustainable under present fiscal conditions, and, furthermore, donor financing will not be available indefinitely. In the longer term: (i) governments will not be able to continue servicing donor-financed road rehabilitation programs from general tax revenues, and (ii) donor-financing will eventually cease. This only leaves one realistic long-term option: road rehabilitation programs have to be financed through the road tariff. There are two qualifications. First, funds for rehabilitation should be clearly designated as a *temporary* surcharge and, second, the costs can be spread and made more affordable by continuing to use international and domestic

borrowing. The decision to borrow should nevertheless be based on a careful assessment of alternative financing options and their costs.

7.2.6 Managing Urban Road Congestion

Pricing and cost recovery policies can be used to manage traffic and generate additional revenues for investment. One of the basic principles of efficiency pricing is that additional road capacity on congested roads should be financed through congestion charges. Capacity should be expanded when the annual costs of road congestion are equal to the annualized costs of expanding capacity. In practice, it is difficult to do this, other than in seriously congested cities and, even then, it is not easy. The only serious attempt made so far in Africa to develop special arrangements for financing urban roads, including possible use of urban congestion charges, is in South Africa (see Box 7.4).

Box 7.4 South Africa's Urban Transport Fund

Urban roads in the declared Metropolitan Transport Areas are financed through local government rates and grants made from an Urban Transport Fund (UTF) administered by a subcommittee of the South African Roads Board. The original intention was to partially support the UTF with revenues collected by applying road congestion charges in urban areas. However, these charges were never introduced. Instead, money was channeled to the UTF from the road fund (in 1986-87 $30 million was transferred), and it is currently financed entirely through a central government grant amounting to about $16 million per year. Money from the Fund is used to finance urban transport plans and infrastructure improvements, provided the latter are designed to assist public transport. The Fund finances 50 percent of the costs of studies (the remaining costs are shared between the provincial government (30 percent), and the local authority, (20 percent). It finances 60 percent of infrastructure costs, with the balance being equally shared between the province and the local authority.

The simplest approach is to start with parking charges, supplemented by improved traffic management to prevent parking charges from spilling over into illegal parking and other avoidance strategies. Parking charges offer a natural transition from the use of physical measures to improve road capacity to the use of congestion charges to ration scarce road space. Full-scale area-wide congestion charging is the next best option. Box 7.5 summarizes methods of charging for urban road congestion and suggests that, presently, the only feasible options for Africa are area licensing and cordon pricing. And area licensing is difficult to administer. The most attractive method is cordon pricing, but such schemes are only suitable when: (i) there are a limited number of major arterial roads entering the city, (ii) traffic using these roads is a major cause of urban road congestion, and (iii) it is possible to intercept traffic on these routes to collect the congestion toll. Only Lagos and Nairobi, together with some cities in South Africa, stand any chance of satisfying these criteria. Urban congestion charges therefore have limited applicability, but they may eventually provide a useful instrument for helping to manage urban traffic and generate additional road sector revenues in large, seriously congested cities.

7.2.7 Likely User Charge Structure

A sustainable road maintenance program generally requires vehicle license fees which vary from about $75 for a car through $500 for a bus or medium truck to about $2,500 for an articulated truck. Alternatively, license fees can be kept at nominal levels and combined with a heavy vehicle license fee, varying from about $200 for a light truck, through $1,000 for a heavy truck to $2,000 for an articulated truck. These license fees need to be combined with a fuel levy of from $0.10 to $0.15 per liter to ensure the costs of operating and maintaining the road network

Box 7.5 Methods of Charging for Urban Road Congestion

There are four main ways of using pricing to reduce urban road congestion: (1) charging for parking, (2) imposing a higher license fee or fuel levy on urban road users, (3) charging a fee for entering the urban road network, or (4) charging for the use of individual streets or designated parts of the urban road network. This box describes methods (3) and (4).

Entry fee systems charge vehicles each time they cross a cordon. Fees can be collected manually or electronically. Manual charging schemes either use *toll booths* to charge vehicles entering the restricted zone, as in Bergen, Norway, or use *area licenses*, as in Singapore. With area licenses, vehicles simply display a supplementary prepaid license when entering and operating within the restricted zone. There is no need for toll booths. General road pricing, where vehicles are charged either on individual routes or when using parts of the road network, are only feasible with electronic charging schemes such as: *Automatic Vehicle Identification* (AVI), *Electronic Number Plate* (ENP), and *Smartcard*. The vehicles equipped with an AVI tag, an ENP, or a Smartcard are identified when they pass an electronic reader. The reader charges either the vehicle's account (precredited or not) or the prepaid Smartcard itself. Oslo and Trondheim in Norway use both manual and electronic tolling systems. Users can thus choose either to subscribe to AVI and be identified or use the manual toll lanes and remain anonymous. The ENP scheme has been tested in Hong Kong and the Smartcard system is currently being tested in Singapore. Electronic charging schemes do away with the need for toll plazas and reduce delays.

Electronic Charging Schemes are generally not suitable for Africa. The technology is still under development and it will be some years before it will be available off-the-shelf. The ALS requires disciplined road users and an effective enforcement system. For these reasons it may not suit Africa at the present time. Therefore, the best practical solutions for Africa are the manual and mixed manual or electronic cordon pricing schemes. But such schemes are only suitable when: (i) there are a limited number of major arterial roads entering the city, (ii) traffic using these roads is a major cause of urban road congestion, and (iii) it is possible to erect toll booths at points which intercept a significant amount of this traffic.

can be fully funded. License fees in most countries, particularly those applicable to heavy vehicles, are generally lower than this and generally need to be raised and/or supplemented by a heavy vehicle license fee. The same is not true of fuel levies (see Figure 7-2). A number of countries either have or are well on their way to having fuel levies of $0.10 per liter. The fuel levies, furthermore, should not make fuel unduly expensive. Prior to the CFAF devaluation, francophone countries frequently priced diesel at $0.70 per liter and gasoline at over $1.00 per liter. Since the devaluation, few countries price diesel at more than $0.55 per liter and gasoline at more than $0.70 per liter (see Figure 7.3). Africa now has some of the lowest fuel prices in the world. A $0.10 to $0.15 fuel levy would still leave fuel prices in most African countries at acceptable levels. Only in a few countries, like Uganda and Malawi, might the introduction of a high fuel levy need to be accompanied by revision of the underlying fuel tax structure to ensure that the final price of fuel was not unreasonably high.

7.3 MANAGING THE REVENUES

The above pricing and cost recovery policies will only influence demand and strengthen market discipline if the revenues collected from road users are spent on roads and used to impose a hard budget constraint on the agencies supplying road services. Furthermore, road users are generally only willing to pay explicitly for roads "provided the money is spent on roads and the work is done efficiently."[32] To that end, it is important to recognize that vehicle license fees,

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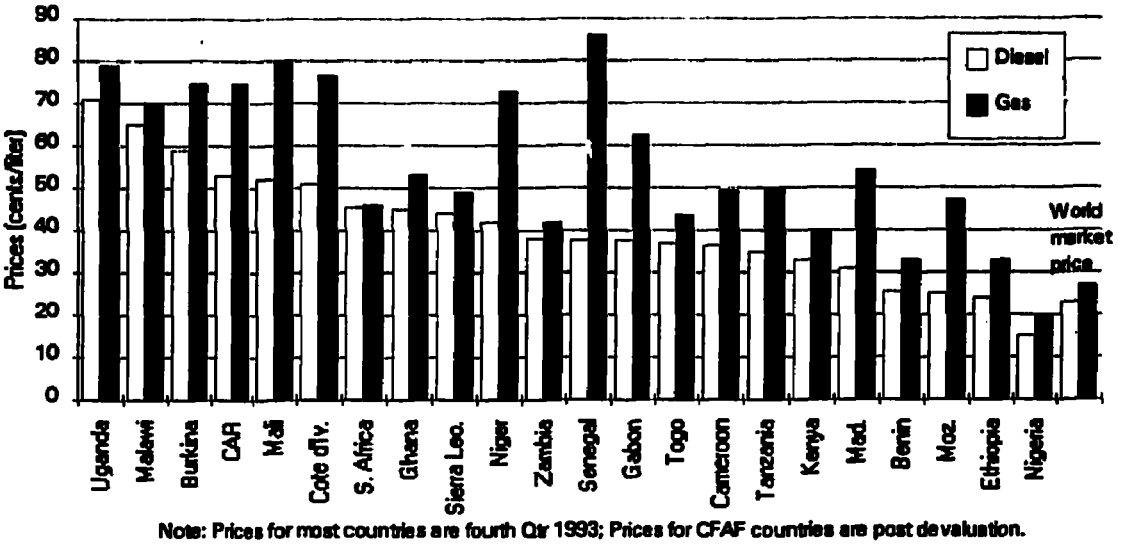
32 During the National Road Maintenance seminar in Zambia, a representative from the road transport industry stated this for the record. The same sentiment was expressed by a representative from the private sector during

heavy vehicle license fees, international transit fees, and the fuel levy are not regular *taxes*. They are the *road tariff* and should not be confused with the general taxes which road users pay. Instead, the proceeds from the road tariff should be collected and deposited into a *special account* to prevent them being diverted and spent on other public programs. These special accounts are normally referred to as road funds. It is important to note that putting roads on a fee-for-service basis, introducing a road tariff and depositing the proceeds into a special account is not the same as conventional *earmarking* (see Box 7.6).

Figure 7-3 Fuel Price in Selected African Countries



Note: Prices for most countries are fourth Qtr 1993; Prices for CFAF countries are post devaluation.
Source: G. Metschies, GTZ, and World Bank.

7.3.1 Establishing a Road Fund

A road fund can be established in one of two ways. It can either be opened under existing legislation or by passing new legislation to establish the road fund as a separate legal entity. The first option is the easiest. The basic legislation in most countries gives the Ministry of Finance powers to open a special account, either through a parliamentary resolution or ministerial decree. The Minister of Finance simply tables a resolution in parliament or the minister or cabinet issues a decree stating: (i) that a special road fund account is being opened, (ii) why it is being opened, (iii) the source of revenues, and (iv) how the account will be managed. The parliamentary resolution establishing the special account for financing main and regional roads in Tanzania is shown in Box 7.7. In Zambia, the road fund was established by the permanent secretary of the Ministry of Finance after parliament had passed an amendment to the Finance (Control and Management) Act. The drawback of the above procedures is that they lack the full backing of the law and do not define the detailed arrangements for managing the road fund.

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an RMI workshop in Tanzania, and a representative of the road transport industry from Zimbabwe made a similar statement at a SATCC meeting in Arusha.

Box 7.6 Earmarking versus Commercialization

Earmarking is the practice of setting aside revenues raised from certain *taxes* to cover specified *public expenditures*. Some economists argue that earmarking imposes undesirable rigidity on government expenditure decisions and should be discouraged. For example, it is inefficient to set aside, say, 20 percent of overall fuel tax revenues to finance national roads, since not all fuel consumption is related to road use. The required expenditures will generally be larger or smaller than this amount, and it may be desirable to use fuel tax revenues for other purposes. However, others argue that earmarking taxes under certain circumstances can improve allocative efficiency by acting as surrogate prices when the taxes are levied on those who benefit from the expenditures. For example, in both the US and Japan, part of the gasoline tax and other motor vehicle tax proceeds are earmarked for the road fund and the income from the fund is used to meet the costs of operating, maintaining, improving, and extending designated parts of the road network. It is argued that such earmarking is a helpful device for approximating benefit taxation and will promote more efficient expenditure decisions.

What is being proposed in this paper is nevertheless not the above type of earmarking. Earmarking generally applies to revenues which: (i) form part of the governments overall tax system and (ii) flow into the government's general revenue account. What is proposed here is a system of user charges which: (i) do not form part of the overall tax system, (i.e., like the landing fees at an airport, they do not form part of the government's sales taxes, excise taxes, and import duties), and (ii) are kept in the accounts of the agency supplying road services. This institutional distinction has important implications for efficiency. The charges create a constituency for the agency supplying the service (i.e., they create a specific market), make the agency more accountable to its users and, by clearly linking revenues and expenditures, are used to impose a hard budget constraint on the road agency. Specifically, what is different about the proposed financing arrangements is that the road tariff:

(i) Is not set within the government's overall tax framework;
(ii) Is set to achieve specific objectives, like demand management and cost recovery for a particular service;
(iii) Is added to pre-existing standard sales and excise taxes or, when fuel is highly taxed, partly replaces and partly adds to pre-existing taxes;
(iv) Is used to impose a hard budget constraint on the agency supplying road services.

The road funds in Tanzania and Zambia should therefore not be classified as *conventional earmarking* since: (i) the road tariff is set by the roads board outside the government's tax framework, (ii) it is set to ensure that all vehicles cover the costs they impose on the road network and collectively cover the entire cost of operating and maintaining the road network, (iii) the fuel levies are added to preexisting standard sales and excise taxes, (iv) the charges are related to road usage, and (v) the proceeds from the road tariff are used to impose a hard budget constraint on the agencies entitled to draw from the road fund.

The second option is to establish the road fund under new legislation. This provides a much firmer basis for the arrangement, although it does have two disadvantages. First, the legislation must set down rules for managing the road fund before the parent ministry has gained experience on what these rules should be. Second, ministers are often reluctant to spend parliamentary time passing new legislation, and this may make it difficult to get the road fund established. It may therefore be easier to establish the road fund using a simple resolution or decree and then to translate the working rules into legislation after all the initial teething problems have been sorted out.

Box 7.7 Parliamentary Resolution used to open a Special Account to support maintenance of main and regional roads in Tanzania

DECLARATION ON THE OPENING OF SPECIAL ROAD FUND
"THE ROAD FUND"
AS ANNOUNCED BY THE MINISTER OF FINANCE

BECAUSE the government has an intention of strengthening the maintenance of core roads in the country after realizing the importance of roads in the restructuring of the country's economy;

AND BECAUSE in fulfilling this objective it is necessary that funds must be obtained for this purpose;

AND BECAUSE under the present procedure of road maintenance, the internal revenue and development fund is not enough for this purpose;

AND BECAUSE in accordance with Clause 17 (1) of the "Exchequer and Audit Ordinance" (Cap.439) whereby the government can open a special fund;

THEREFORE, FOR THOSE SPECIAL PURPOSES,
THIS PARLIAMENT IS SUGGESTING THAT

(a) There should be a special fund called "The Road Fund."

(b) The objectives of this fund should cover costs of rehabilitation and maintenance of major and core roads.

(c) Money for this fund should come from:

(i) Road tolls as charged from diesel and petrol at an amount to be decided by the Minister of Finance,
effective July 1991/92.

(ii) Various levies and duties from motor vehicles such as licenses, registration and transferring of vehicles, at an amount to be decided by the Minister of Finance effective July 1992/93.

The Ministry of Works will be responsible and will monitor this Special Fund and the Ministry of Works will need to get an authority from the Planning Commission and the Ministry of Finance before embarking upon any project.

Note: Translated from the original in Swahili.

7.3.2 Review of Existing Road Funds

There are a large number of road funds in Africa (see Tables 7.4 and 7.5). None are perfect and most have serious faults. A recent review has nevertheless identified what works and what does not work. This section focuses on some of the underlying weaknesses which cause road funds to fail, while the next section concentrates on how to avoid these pitfalls and design an effective road fund. The features which adversly affect operations include: (i) generic design problems which affect the overall operation of the road fund, and (ii) specific problems which only affect certain parts of the operation.

Generic design problems include:

(i) *Funding problems.* The ministry of finance stops paying money into the road fund, holds up the release of funds (as happens in Ghana), or takes money out of the road fund and uses it for other purposes. In CAR, the government borrowed money from the road fund to pay civil service salaries, while in Mozambique, Sierra Leone, and Tanzania there have been several occasions when the ministry has withheld funds. This is generally caused by poorly designed arrangements for collecting road fund revenues, paying them into the special account, and authorizing their release. It may also be caused by a weak or nonexistent road fund board, and ambiguous legislation.

(ii) *It looks too much like earmarking.* Anything that looks like traditional earmarking will be opposed by the ministry of finance and the International Monetary Fund (IMF). This generally happens when funds deposited into the road fund include service fees and general taxes (as in Benin and Ghana), or where the road tariff is specified as a portion of the government's regular fuel taxes (as in Mozambique and Chad). Depositing such funds into the road fund clearly looks like the earmarking of general tax revenues, and such funds will be under the constant threat of closure.

(iii) *Oil companies withhold payment.* This usually happens when the government is in arrears on its own payments for fuel (as in Chad, Rwanda, and Zaire). When that happens, the oil companies stop paying the fuel levy and also withhold payment of government sales and excise taxes. This is a country problem, but it is also related to the influence of the road fund board. A strong board should be able to persuade the oil companies to pay up.

(iv) *Insufficient road fund coverage.* This happens when the road fund is set up to finance only part of the qualifying expenditures, with the balance being financed through the governments recurrent or development budget. Once road agencies are getting some money from the road fund, it often becomes even more difficult to get funds allocated through the normal budgetary process (this happens in Ghana where the road fund was originally set up to finance only 60 percent of periodic maintenance). Road funds should be set up to eventually finance *all* qualifying expenditures.

(v) *Excessive road fund revenues.* This is rare, but happens when the initial road tariff is set too high. The high tariff generates a large surplus, encouraging other ministries to *raid* the fund or bring pressure to have it closed, as happened in Mali during the 1970s and has recently happened in South Africa.[33] Clearly, there should be arrangements for varying the level of the road tariff.

The specific problems which only affect certain operations are often related to the above generic problems but deserve special mention. They include:

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33 About one-third of the pump price of fuel was earmarked for the South African Road Fund. In 1989, when the Fund was abolished, more than $0.15 per liter was earmarked. This high levy caused the Road Fund to build up a large surplus. This led to concern that the South African Roads Board might go on a spending spree, and this eventually led to the dedicated Fund being abolished.

(i) *Legal problems.* The road fund lacks a firm legal basis. This usually happens when the legislation is prepared too quickly or without adequate preparation and ends up being too inflexible. This affects a number of road funds. It can be avoided by establishing the road fund under existing legislation and only passing legislation after the initial teething problems have been sorted out (as in Tanzania and Zambia), or spending more time preparing the operating procedures before passing the legislation.

(ii) *Ineffective and inconsistent management.* This may happen when there is no road fund board (as in Ghana), when there is a board but with the wrong membership (the initial board in South Africa, which primarily consisted of provincial representatives, found it difficult to get the provincial members to act in the national interest), or when it meets too infrequently (as in Rwanda).

(iii) *Inconsistent road tariff.* The tariff is inconsistent and not able to deliver a clear market signal to road users. This happens in Ghana (where vehicle inspection fees and taxes on kerosene are paid into the road fund) and in Tanzania (where the parliamentary resolution provides for car benefit, and vehicle transfer taxes to be paid to the road fund).[34] The road tariff should consist only of vehicle license fees (including heavy vehicle license fees and axle-weight fees), the fuel levy, international transit fees, and bridge and ferry tolls.

(iv) *Inability to adjust the road tariff.* There is no mechanism for adjusting the road tariff other than through the normal tax-setting process combined with approval by several ministries that have nothing to do with roads (as in the case of Mozambique). This makes it difficult to adjust the tariff for inflation or to generate additional revenues.

(v) *Problems collecting the road tariff.* This happens when the revenues are collected by the customs and excise department and channeled through the Ministry of Finance, before being paid into the road fund. The ministry of finance almost invariably withholds some of these revenues (as in Mozambique and Tanzania). The best solution is to have the road tariff collected under contract and deposited directly into the road fund. Among other things, this emphasizes its role as a user charge.

(vi) *No mechanism for objectively allocating funds.* When the road fund finances roads managed by different road agencies, it needs transparent and equitable procedures for dividing the revenues between these road agencies. Sometimes, as in Ghana, it is merely a question of dividing the revenues between the agencies responsible for the main, urban, and rural roads. In others, as in Tanzania, it may involve dividing funds between more than 100 district councils. One of the persistent weaknesses of most road funds is that they have no objective procedures for allocating funds. As a result, allocations tend to be erratic, as in Ghana, or subject to political whim. For example, in Tanzania, weak allocation procedures resulted in 75 percent of the funds allocated for urban and rural roads going only to urban areas.

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[34] At present, the fuel levy is the only user charge being paid to the Tanzania Road Fund.

Table 7.4 Review of Road Funds in Selected Countries in Sub Saharan Africa: Legal and Administrative Arrangements

Country	*Legal basis*	*Status*	*Management structure*	*Board composition*	*Type of work financed*
Benin	Decrees; 1984, 85 and 1992	Public utility	Board Director and staff	6 Civil servants 2 Private sector	Routine and periodic maintenance
CAR	Ordinance, 1981 and decree, 1991	Public utility	Board Director and staff	11 Civil servants	Routine and periodic maintenance
Mozambique	Decrees, 1989 and 1990, amended in 1993	Bank account	Board Director of roads	7 Civil servants Examining possibility of participation from the private sector	Routine and periodic maintenance Rehabilitation
Rwanda	Act, 1989 and decree, 1990	Bank account	Board Director of roads	7 Civil servants 1 Road haulier	Maintenance
Sierra Leone	Opened, 1989, incorporated in SLRA Act, 1992	Bank account	Board Director of SLRA	Chairperson 3 Civil servants 3 Private sector 3 chosen by Minister of Works	Routine, periodic, and emergency maintenance
South Africa	National Road Act, 1935, amended in 1971	Bank account	Board Director and deputy Director-general, Tpt Director of roads	3 Civil servants 1 Local government 1 City representative 3 Private sector	Routine, periodic, and emergency maintenance Investment Studies, research and bursaries
Tanzania	Parliamentary resolutions, 1991, 1992	Bank account	Board Ministry of works Prime minister's office	Roads board oversees MOW fund Chairperson 8 Civil servants 4 Private sector	Routine and periodic maintenance Rehabilitation
Ghana	Executive decree, 1985	Bank account	Director of roads and highways	Board suspended by the military govt in 1984	Periodic maintenance
Chad	Law, 1993 and decree, 1994	Bank account	Director of roads	No board	Routine and periodic maintenance

Source: de Richecour, 1994.

Table 7.5 Review of Selected Road Funds in Sub Saharan Africa: Financial Arrangements

Country	*Source of funds*	*Size of fuel levy (dollars/liter)*	*Who sets the fuel levy*	*How is it deposited*	*Annual revenues (million $)*	*Arrangements for accountability*
Benin	Fuel levy Weigh-bridge fees Bridge tolls Transit fees VAT and import duties Govt. allocation	Premium gasoline, 0.008 Diesel 0.007	Ministry of Finance	Through Ministry of Finance	1.8	Separate accounts Internal audit Independent audit
CAR	Fuel levy Ferry tolls Weigh-bridge fees	Gasoline and diesel, 0.095	Ministry of Finance	Direct deposit	3.0	Separate accounts Internal audit Independent audit
Mozambique	Fuel levy Transit fees Bridge tolls	Premium gasoline, 0.18 Regular, 0.12 Diesel, 0.04	Min. of Industry and Price Commission	Through Customs	6.3	Financial and technical control Independent audit (newly introduced)
Rwanda	Fuel levy Road toll fees	Gasoline, 0.133 Diesel, 0.112	Ministry of Finance	Direct deposit	8.0	Separate accounts Independent audit
Sierra Leone	Fuel levy	Gasoline and diesel, 0.04	Ministry of Finance	Through Customs	3.2	Separate accounts Internal control Independent audit
South Africa	Govt. allocation Miscellaneous	n.a.	n.a.	n.a.	152.0	Audit by auditor general
Tanzania	Fuel levy	Gasoline and diesel, 0.06	Min of Finance on advice of Central Roads Board	Through Customs	21.5	Audit by Tanzania Audit Corporation
Ghana	Fuel levy Bridge, ferry, and road tolls Veh inspection fees	Gasoline, 0.025 Diesel, 0.02	Ministry of Finance	Direct deposit	24.0	Audit by auditor general and Independent audit
Chad	Fuel levy Transit fees Road and ferry tolls Axle-weight tax	16 percent of all fuel taxes	Ministry of Finance	Through tax authority	3.1	Separate accounts Independent audit Internal control

Source: de Richecour, 1994.

(vii) *Unsatisfactory audit procedures.* Financial transactions are at least audited by the auditor general, thus helping to ensure that funds paid into the road fund are accounted for and that there is some check on whether they were disbursed to finance approved expenditures. It does not provide a check on whether the work was actually done and done according to specification. Such checks are particularly important when the work is done by force account.

The above observations can now be used to define the key features which need to be considered when designing a new road fund.

7.3.3 Designing a Road Fund

To avoid setting up a conventional, earmarked road fund, a special account should only be introduced in conjunction with an explicit road tariff. The road tariff should consist of license fees, a fuel levy, bridge and ferry tolls, and international transit fees. The proceeds from the road tariff should then be deposited into the road fund. To ensure that the road fund functions effectively, it should be designed in the following way:

(i) *Collecting the revenues.* The proceeds from the road tariff should be collected and deposited directly into the road fund without having to pass through the accounts of the customs department or the Ministry of finance. The oil companies should deposit the fuel levy directly into the road fund, and both license fees and international transit fees should ideally be collected under contract. Fuel levies in Ghana, CAR, Chad, Rwanda, and Zambia are collected by the oil companies and deposited directly into the road fund. Chad is proposing to collect license fees under contract, and Mozambique and Zambia are proposing to collect international transit fees under contract.

(ii) *Road Fund management.* The road fund should be managed by a strong board with clear terms of reference. When one road agency is responsible for managing the entire road network (as in Sierra Leone), the road fund can be managed by the same board as the road network. Otherwise, there should be a separate road fund board. The board should have a broad-based membership and meet regularly. The boards in Sierra Leone, South Africa, Tanzania, and Zambia all have potentially strong, representative boards capable of managing the funds effectively.

(iii) *Setting the road tariff.* There should be a formal mechanism for varying the road tariff and charges should be indexed to ensure that they keep pace with inflation. The board should either have the power to set the tariff (in the same way the railways set their tariffs) or at least to recommend tariff levels to the Ministry of finance for inclusion in the annual budget statement. Both Tanzania and Zambia propose to use the latter method, and the Ministry of finance in Tanzania has indicated that it would have great difficulty approving tariff increases without the support of the board.

(iv) *Allocation of funds.* There should be a simple and consistent procedure for allocating funds between the different agencies entitled to draw from the road fund. This is discussed in section 7.3.4.

(v) *Auditing arrangements.* Once road maintenance is fully-funded, the road fund will be handling $25 to $50 million per year, and it then becomes important to ensure that these

large sums of money are properly accounted for. The audit should make sure that revenues are collected efficiently (i.e., avoidance, evasion, and leakage are kept to a minimum), funds are only disbursed to finance approved expenditure programs, funds are actually spent on these programs, and the work is carried out according to specification. This generally requires an independent financial audit, a technical audit of all contract work, and a selective audit of work done through force account. The best arrangements are those involving an independent financial audit (as in Benin, CAR, Chad, and Sierra Leone) and a technical audit of work done under contract (as in Benin and CAR) and through force account (as in Benin).

7.3.4 Allocating Funds

It is important to have allocation methods which are simple, transparent, and encourage consistency in standards between roads managed by different road agencies. There are three basic methods. They range from simple to complex and establish priorities in an increasingly complicated way. They include methods which use: (i) a simple allocation formula, (ii) an indirect assessment of needs, and (iii) a direct assessment of needs.

Several countries, including Japan (see Chapter 3, Box 3.2), use a simple formula to allocate funds between different road agencies. Ghana has one of the simplest formula-based methods. When it started, it simply allocated 80 percent of the road fund resources to trunk roads and the remaining 20 percent to rural roads. When funds were first allocated for urban roads, the formula changed to: trunk roads, 52 percent, rural roads, 28 percent, and urban roads, 20 percent. The proportions have changed every year since then and, in principle, have attempted to equalize priorities at the margin. Mozambique developed an even more elaborate formula for allocating funds between urban, provincial, and rural roads (it is spelled out in a 1990 decree which has been temporarily superceded by a new allocation process established as part of a donor-financed National Roads Program). The method is similar to that used in Japan. The formula allocates the fuel levy as follows: (i) 80 percent of the revenues from super gasoline go to cities, (ii) the remaining 20 percent go to cities with low revenues (as decided by the Ministry of Finance), (iii) 60 percent of the revenues from regular gasoline go to provinces, (iv) 20 percent of these revenues go to rural roads, and (v) the remaining 20 percent go to the general budget to support programs "on energy and minerals" (basically to compensate other sectors for having to pay the fuel levy).

The indirect needs-assessment method bases allocations on an indirect measure of priority. It is done indirectly because there are either no reliable data to do so directly, or there are insufficient technically qualified staff to analyze the data. There are several methods available and all try to use information on population, land area, road length, agricultural output and per capita income to assess: (i) road sector needs, (ii) ability to finance these needs from local resources, and (iii) the need for matching grants. Tanzania is currently developing an indirect needs-based assessment method to help allocate the 20 percent of the road fund allocated for district roads to the 101 district councils entitled to draw on these funds (see Box 7.8).

The direct needs-assessment method bases allocations on a direct assessment of priorities and can be more or less complicated, depending on the technical capacity of the individual road agencies. Tanzania uses this method to allocate routine maintenance funds between the twenty regions under the jurisdiction of the roads department. It uses standard unit rates for each routine maintenance activity by type of road surface. These rates are then

multiplied by the length of maintainable road in each region (the *core* network) to arrive at the total routine maintenance budget required by each region. South Africa also uses this method, but also applies it to periodic maintenance (see Box 7.9). It is planning to improve on the method by linking it to an inspection system which will enable standard unit rates to be replaced by figures based on actual road conditions.

Box 7.8 Procedures for Allocating Funds to District Councils: Tanzania

In Tanzania, 20 percent of the road fund receipts are allocated to support maintenance and rehabilitation of district roads. There are eighty-four rural and seventeen urban districts outside Dar es Salaam (which currently receives its own road fund allocation), and the task of the Prime Minister's Office (PMO), which administers this part of the road fund, is to decide how to allocate this money to individual districts in an efficient and equitable manner. Previous attempts to allocate these funds, using general guidelines issued by the PMO, were not satisfactory. Key weaknesses were that: (i) three-quarters of the funds went to urban district councils (they simply prepared better road programs), (ii) about one-quarter of the rural districts received no funds at all, and (iii) there was no consistency in the amounts allocated to individual districts (some received a fraction of what they asked for, while others received all or more than they asked for).

The PMO therefore decided to develop a formula-based allocation system for which reasonable data were available and which would be: (i) based on needs, (ii) simple, (iii) transparent, and (iv) fair. A major consideration was the lack of accurate data. This meant the system not only had to satisfy the above criteria, but also had to be robust. It was therefore decided to use an index-based system in which districts would score between three and nine points on a scale, entitling them to receive three possible allocation levels from the road fund as follows (note that there are 101 districts entitled to draw from the road fund so that each, on average, would receive 1.0 percent of road fund revenues):

- 8-9 points High allocation equal to 1.3 percent of road fund revenues;
- 5-7 points Medium allocation equal to 1.0 percent of road fund revenues;
- 3-4 points Low allocation equal to 0.7 percent of road fund revenues.

The formula which determines the allocation index contains three elements:

Index = population density + road density + PMO rank.

Population density is there to measure trip generation rates, while road density is primarily a separation parameter to differentiate between urban and rural districts. The PMO rank, which is a grading system used to decide budget subventions, grades districts according to their stage of development. It thus measures the level of commercial activity (i.e., it also measures trip generation). The index runs from one = least developed to seven = most developed. Points are allocated on the following basis:

Population density:		
High	more than 100 persons per sq km	3 points;
Medium	more than 27 and less than 100 persons per sq km	2 points;
Low	less than 27 persons per sq km	1 point.
Road density:		
High	more than 120 m per sq km	3 points
Medium	more than 30 and less than 120 m per sq km	2 points
Low	less than 30 m per sq km	1 point
PMO rank:		
High (active)	rural, 6-7; urban, 5	3 points
Medium (moderate)	rural, 3-5; urban, 3-4	2 points
Low (inactive)	rural, 1-2; urban, 1-2	1 point

The highest possible score is 9 (a commercially active district with high population and road densities), while the lowest is 3 (a commercially inactive district with low population and road densities).

7.3.5 Disbursing Funds

The final task is to work out procedures for disbursing funds to individual road agencies. These procedures are important, since they can be used to strengthen financial discipline. There are three ways of structuring these procedures. The road fund can either: (i) disburse funds directly to the road agencies, (ii) settle bills periodically after certification that approved work has been completed satisfactorily, or (iii) disburse funds on a conditional basis and undertake technical and financial audits *ex post*.

The first method is the simplest, but it does little to strengthen financial discipline. Funds are simply disbursed directly to each road agency and the agencies then have to account for the way that they spend the funds within the usual government audit framework. The financial audit of the road fund simply checks to ensure funds-in match funds-out. The road agencies are not accountable to the road fund, but to their parent ministry, which is expected to ensure that the money has been spent on roads and the work has been done according to specification. In Ghana, road fund revenues are split at the source and paid directly into the accounts of the Ghana Highway Authority, the Department of Feeder Roads, and the Department of Urban Roads. Each agency then has to prove to the Ministry of Roads and Highways that it has used the resources efficiently (Box 7.10 summarizes the way funds are disbursed for rural roads). The road fund thus plays no part in checking to ensure that road fund revenues produce value for money.

The second method involves more oversight by the road fund. The road fund disburses funds on a regular basis, but it only does so after certification that the work has been completed according to specification. This requires an approved work program, together with a system of technical and financial audits. It works best when the work is done under contract, but it can also be applied to force account work. This procedure is used in Benin, CAR, and Mozambique. Mozambique has well-developed procedures for controlling work at the provincial level. A provincial inspector is appointed for each contract and he is responsible for supervising the contractor, administering the contract, and certifying payments (the contractor is a parastatal construction enterprise). The contractor submits monthly statements of work completed and, within fifteen days of presentation, the inspector has to certify the work for payment. In Benin, similar arrangements are used for force account work. However, such rigorous procedures are only effective when there are enough qualified inspectors to certify the work and they are mobile, experienced and hence sufficient authority to stand up to contractors.

Box 7.9 Procedures for Allocating Funds Between Different Road Authorities: South Africa

In South Africa, the Department of Transport advises the Ministry of Finance on the allocation of funds to individual road authorities. It currently does so using a simplified procedure which assumes that the standards of all maintainable features within the individual road authorities are approximately the same. In the medium term, it plans to introduce an inspection system so that maintenance needs can be adjusted to take account of *actual* road conditions. In the longer term, this will be replaced by a maintenance management system enabling each road authority to base its maintenance requests on a series of nationally accepted maintenance standards based on objectively measured road conditions.

For purposes of estimation, maintenance is divided into two main categories: (i) routine maintenance (patching and sealing cracks, maintaining gravel shoulders, maintaining drainage, attending to the road reserve, and maintaining road signs and markings); and (ii) periodic maintenance (maintenance of bridges, resealing, and minor road safety improvements). A matrix of unit maintenance rates – for each type of road, traffic condition, and activity group – is then applied to all the roads under the jurisdiction of each road authority to arrive at the total *essential* maintenance requirements (see table below). For this purpose, roads are classified as freeways, conventional four-lane roads, surfaced two-lane roads (roads with ADT greater than 12,000 vpd, primary roads with ADT greater than 4,000 vpd, other roads with ADT greater than 4,000 vpd, and other roads with ADT less than 4,000 vpd), and gravel and dirt roads (roads with ADT greater than 1,200 vpd, roads with ADT greater than 500 vpd and less than 1,200 vpd and secondary roads with ADT less than 500 vpd, and all other roads with ADT less than 500). In the case of local access roads, where no traffic figures are available and very low maintenance standards are applied, a flat figure of $70 per km is used.

Finally, the above figures are adjusted to account for: (i) environmental conditions, and (ii) restricted funding levels. Average maintenance costs are assumed to apply to all areas which are dry or have moderate rainfall. An adjustment is only made for areas with heavy rainfall. The environmental adjustment factors are applied to each item of maintenance and vary from zero (road safety improvements), through 25 percent increase (gravel shoulder maintenance) to 30 percent increase (blading gravel roads). The above calculations provide an estimate of *essential* maintenance levels (the level required to keep the road network in stable long-term condition) and these are then supplemented by estimates of the *minimum* funding level (the level which will not compromise road safety, but where the infrastructure may start to deteriorate) and the *danger* funding level (the level where road safety is compromised and maintenance is confined to essential work). The minimum funding level is about 22 percent lower that the necessary level, while the danger level is about 32 percent lower.

Maintenance Unit Rates Per Carriageway km, 1992
(dollars)

Activity	Surfaced roads					*Activity*	Gravel	
	Freeway	*4-Lane*	*Primary (ADT> 4,000)*	*Other (ADT> 4,000)*	*Other (ADT< 4,000)*		*ADT> 500*	*ADT< 500*
Routine maintenance:						*Routine maintenance:*		
Patching and crack sealing	300	260	525	420	350	Blading	35 + 1.75 ADT	
Gravel shoulders	35	52	210	315	160	Drainage	123	88
Drainage	160	140	195	175	160	Road reserve	877	420
Road reserve	890	420	525	350	195	Signs and markings	456	350
Road signs and markings	455	350	350	315	280			
Sub-Total	1,840	1,222	1,805	1,575	1,145	Sub-Total	n.a.	n.a.
Periodic maintenance:						*Periodic maintenance:*		
Bridges	122	88	105	88	70	Bridges	26	18
Resealing	6,030	2,495	2,495	2,495	2,495	Regraveling	525 + 2.8 ADT	
Road safety improvements	-	425	170	496	63			
Sub-Total	6,152	3,008	2,705	3,079	2,628	Sub-Total	n.a.	n.a.
Grand Total	8,384	4,492	4,957	4,987	4,016	Grand Total	n.a.	n.a.

Source: Planning Committee for Road Financing, 1992.

Box 7.10 Procedures for Disbursing Funds for Rural Roads in Ghana

In Ghana, the Department of Feeder Roads (DFR), which forms part of the Ministry of Roads and Highways, has been designated as highway authority for a feeder road network of about 22,000 km. The network is administered through a fairly decentralized structure comprising ten regions, with ten districts per region. The planning cycle starts when district secretaries are requested to submit a road program to the regional planning officer. These programs are discussed at local meetings where DFR staff provide technical advice and help to prepare the schemes. Funds are allocated centrally and come from the road fund (25 percent is allocated to the DFR) and the central government budget. District requests are balanced centrally and matched with the available funds. Routine maintenance funds are transferred to the regional engineers who manage the funds and report back to headquarters on progress in the field. District assemblies are advised of approved work programs and play an active role in ensuring that work is carried out effectively. Completed work is checked by headquarters on a selective basis. In the case of rehabilitation, periodic maintenance, and minor works, completed work is certified by the regional engineer and regional planning officer before funds are released. Most civil works are done by small-scale contractors. The DFR has about 700 staff of its own, comprising forty engineers, 560 technicians, accountants, secretaries and other administrative staff, and 100 casuals. About 10 percent are stationed at headquarters.

The third method is designed to handle a decentralized system of road administration. Under this arrangement, the road fund allocates funds directly to each road agency — sometimes on a monthly basis — and then audits the use of the funds at the end of the fiscal year. The results of the audit report may then be used to help determine subsequent road fund allocations. Tanzania uses this system to channel funds to urban and rural district councils. Funds are routed to districts through the regional development director who is expected to audit the work to ensure that the funds are actually spent on roads and that the work is done efficiently. Zambia is currently implementing a similar system covering the entire road network. The intention is to subject completed works to a full financial and technical audit and to use the results to help decide on matching grants for the next budget period.

The above arrangements can help to strengthen financial discipline. The second method imposes *ex ante* discipline on each road agency by only disbursing funds against evidence that works have been carried out satisfactorily. The only drawback is that it involves a great deal of field inspection. It is therefore only suitable for major road projects, and this usually means work on the main and regional road networks. The third method operates *ex post* and can be applied to any number of roads because the audit (particularly the technical audit) can be done on a sample basis. When the results of the audit are used to help decide on subsequent matching grants, the method can also be used to combine the devolution of responsibility with an assurance of quality.

8 ASSIGNING RESPONSIBILITY

This chapter deals with the issue of assigning responsibility for managing different parts of the road network and managing road traffic. Managing road traffic includes responsibility for controlling vehicle weights and dimensions, providing road signs and signals, controlling vehicle safety, regulating motor vehicle emissions, managing on-street parking, and managing urban road congestion. This chapter discusses the basic principles which guide the way responsibilities are assigned, how they affect overall management of the road network, and how they affect responsibility for managing road traffic.

8.1 BASIC PRINCIPLES

The first task is to prepare a functional classification of the road network. That means measuring its length and condition and establishing the legal status of individual roads (i.e., whether they have been gazetted and assigned to a legally constituted road agency). This calls for an accurate road inventory, a condition survey (also recording pavement strength), and identification of the responsible road agency. Since some roads may not have been gazetted, the second task is to assign these roads to a legally constituted road agency or, in the case of community roads, to the responsible community group (e.g., village council). There may also be a need to reclassify selected roads. Traffic may have grown on some roads and their status will need to be upgraded (e.g., from regional to trunk roads), while traffic may have fallen on others which might need to be downgraded.

Once the network has been classified, responsibility for managing different parts of the road network has to be assigned. The organizational structure attempts to reconcile three conflicting objectives. First, it attempts to assign responsibility to agencies with sufficient financial and technical capacity to manage the roads placed under their jurisdiction. Second, most countries are attempting to decentralize managerial responsibility to reduce the fiscal burden on the central government and strengthen accountability. Managerial responsibilities are thus being increasingly assigned to provincial and district-level governments, even though local governments rarely have the financial and technical capacity to effectively discharge these responsibilities. Finally, there are always areas where responsibilities overlap. Most countries attempt to deal with this by establishing a formal coordination mechanism.

It is easiest to define responsibilities by starting at the bottom and working upwards. This means starting with community roads, working up through *special purpose* roads (e.g., game department roads) and local government roads, and ending up with the national trunk road network (see Box 8.1). The agencies responsible for managing roads include village-level governments, special-purpose central government departments or parastatal boards, rural district councils, urban district councils, and central government agencies. The local government agencies generally operate under the overall jurisdiction of a central government agency, usually the ministry of local government. There are also other options. For example, the agency with prime responsibility for managing roads may delegate this responsibility to other public or private sector agencies. In both Ghana and Sierra Leone, the road agency can delegate management of selected roads to "a local authority or other competent body." Alternatively, government may establish a special-purpose agency to manage selected high-density roads (e.g., through an autonomous toll road agency) or invite the private sector to build and operate such

roads under a management contract (as in South Africa), or under a concession agreement (as is increasingly being done in Asia and Latin America).

Box 8.1 Criteria for assigning responsibility to different government organizations

The following criteria can be used to decide which functions ought to be: (i) assigned to any level of government acting as agents on behalf of beneficiaries, (ii) assigned to local governments acting as agents on behalf of the central government, (iii) retained by the central government, or (iv) delegated to parastatals or special purpose agencies.

Criteria for assigning responsibility to local communities. Consideration could be given to assigning responsibilities to local communities for providing services which: (i) require community-level location-specific decision making because the area served has relatively unique characteristics in terms of service requirements; (ii) do not have significant consequences for priority objectives of the country as a whole; (iii) require local participation; and (iv) are not capital intensive, have few economies of scale, and do not require support from other agencies because of their ability to use simple technology.

Criteria for assigning responsibility to local governments. Responsibilities can be assigned to local governments as principal agents acting on behalf of central governments for services which: (i) have significant consequences for priority objectives of the country as a whole; (ii) require some location-specific adaptation to unique features of the environment within which operation and management need to take place; (iii) have some economies of scale, compared with operation and management at either the local or national level; (iv) are relatively small-scale and labor intensive, but require significant levels of technical, logistical, and/or managerial support; (v) are more easily contracted-out to the private sector at local levels than would be the case at the national or regional level; or (vi) involve activities which local governments do not now have the capacity to implement, but for which it is desired that they develop such capacity so as to serve as discretionary authorities in future.

Criteria for Retaining Authority at the Center. Criteria for retaining authority at the central government level is the easiest to identify because it includes anything which is not assigned to local communities, local government, or delegated to parastatals or special purpose agencies. Responsibilities of central governments should nevertheless include those activities which define the overall enabling environment, such as: (i) responsibility for overall monetary policy, (ii) elimination or minimization of internal tariffs, (iii) coordination of external tariffs, and (iv) maintaining coordinated legal and judicial systems protecting property and contracts. In addition, it is not prudent to assign discretionary authority to local governments for activities which have high priority for a country as a whole, because it is unlikely that central governments will sustain local discretion over the longer-term.

Criteria for delegating responsibility to parastatals or special purpose agencies. Criteria vary depending on the type of organization to which responsibility will be delegated. Criteria for delegation include: (i) requirements are technical and capital, rather than labor intensive, and (ii) requirements do not need significant supporting actions by other government agencies. Criteria particular to one or another type of organization can also be specified. For *parastatals* (e.g., autonomous highway authorities), the range of activities should focus on the delivery of a single, discrete service (or limited range of discrete services), and the activities should be of a commercial or quasi-commercial nature (but are considered public goods by virtue of tending toward natural monopolies). For *special purpose agencies* (e.g., game parks, cocoa marketing board), the range of activities should focus on delivery of a single, discrete, service (or limited range of discrete services), and they should also be of a commercial or quasi-commercial nature (as in the case of parastatals). However, the efficient and effective delivery of services should require location-specific decisionmaking because the area served has relatively unique characteristics which do not coincide with the regular administrative boundaries of the government.

Source: J. Silverman.

Similar principles apply when defining responsibility for managing road traffic. Those issues which are primarily local in nature (e.g., managing urban road congestion), are normally assigned to urban district councils, while those dealing with use of the network as a whole are normally handled by the central government (e.g., regulating vehicle weights and dimensions). Again, the agency with prime responsibility may delegate some of these responsibilities to other

government agencies or to the private sector (e.g., axle-weight enforcement and vehicle inspection).

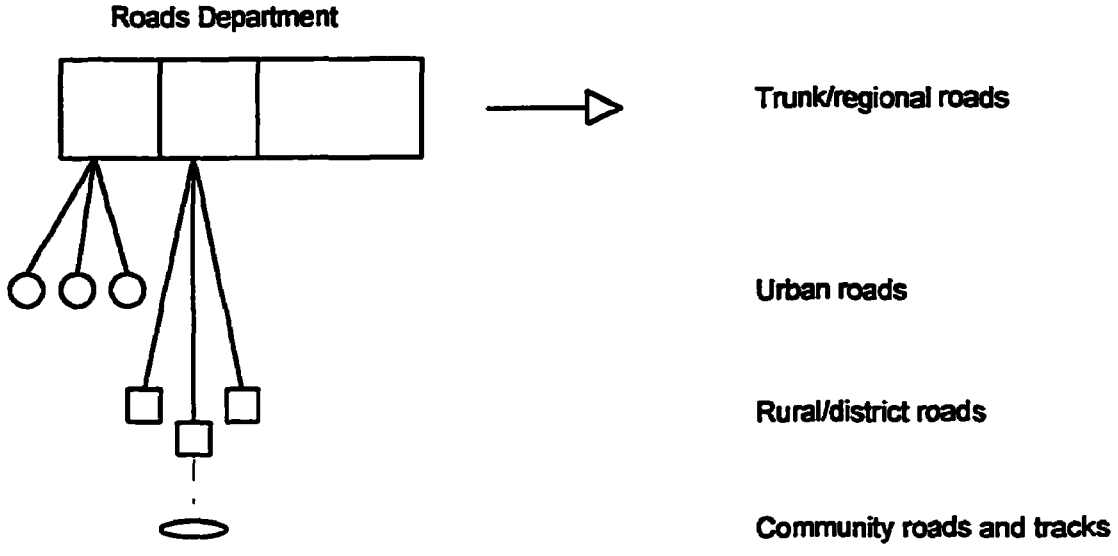
8.2 MANAGING THE ROAD NETWORK

For purposes of defining managerial responsibility, the road network is usually divided into six functional classes. Working from the bottom up, they are: (i) community roads, (ii) special purpose roads, (iii) rural roads, (iv) urban roads, (v) regional roads, and (vi) major trunk routes. There are several ways of assigning responsibility for managing these roads. The preferred choice usually depends on the size of the country, the extent of motorization, and the structure of the central and local governments. The three management models which are most common include the single-tier, double-tier, and three-tier systems. Each is outlined below.

8.2.1 Single-Tier Systems

The simplest model is the single-tier road agency where one or more central government agency is responsible for managing the entire road network (see Figure 8.1). Community roads, which essentially consist of the unclassified road network, may either be left in the hands of village councils or placed under the jurisdiction of the central government. This model suits small, compact countries with a centralized system of government. Both Sierra Leone and Ghana have chosen this model.

Figure 8.1 Diagram Illustrating Single-Tier Organizational Structure



In Sierra Leone, which has a classified network of 11,669 km (including 360 km of urban roads), management of the entire road network has been put under the jurisdiction of the Sierra Leone Roads Authority (SLRA), established in 1992. To ensure that the management of feeder roads keeps in touch with local communities, the Authority has a special Feeder Roads Department which deals exclusively with the 4,254 km feeder-roads network. The Authority also has powers, as yet untested, to delegate responsibility for managing selected parts of the road network to local government agencies or other competent bodies. It is expected that, as the

road network expands, management of some urban roads and parts of the rural road network will be delegated to local government agencies.

Ghana also operates a single-tier system. However, being a much larger country (it is over three times the size of Sierra Leone), it has established three separate central government agencies, under the Ministry of Roads and Highways, to manage different parts of the road network. The entire 21,830 km feeder-roads network, that includes all roads that were formerly private or managed by the Cocoa Board, is managed by the Department of Feeder Roads (DFR). The 2,801 km urban road networks in Accra (partly), Tema, Sekondi/Takoradi, and Kumasi are managed by the separate Department of Urban Roads (DUR). Finally, the 14,100 km trunk road network, including urban roads outside the four main cities, is managed by the Ghana Highway Authority (GHA).

It is worth noting that Ghana had a single highway authority in 1974 which was responsible for managing all roads in the country. However, in 1981 the government found it necessary to create the DFR to improve the management of rural roads. Experience with the DFR suggests that a strong, highly decentralized, feeder-roads agency working alongside the main road agency (they both belong to the same ministry) can be a highly effective way of managing rural roads. The DUR was likewise created in 1988 to strengthen the management of urban roads. The intention with the DUR is to eventually transfer responsibility for managing urban roads to municipal governments as soon as they have developed the capacity to manage them. Responsibility for maintenance has already been transferred to the Accra Metropolitan Assembly, and the same will eventually happen in the other three major cities. The GHA also operates a short section of toll road between Accra and Tema and is considering expanding the toll road network under concession agreements with the private sector.

8.2.2 Two-Tier Systems

Two-tier systems make a clear distinction between the central and local governments (see Figure 8.2). They also tend to leave more roads in the hands of local communities (e.g., village councils). The model suits larger countries where it is not feasible to effectively manage an extensive road network through a system of centralized road agencies. Both Tanzania and Zambia have chosen this model. Tanzania is about four times larger than Ghana, while Zambia is three times larger. On this scale, single-tier systems tend to break down since a single road agency — generally lodged in the ministry of works — becomes too remote from the actual users of the road network.

Tanzania has an extensive network of unclassified roads. There are at least 28,000 km of such roads which serve game parks, large commercial farming interests (tea, cotton and pyrethrum), or local communities. Central and local governments take no formal responsibility for these roads, although some efforts are currently being made to find better ways of dealing with them.[35] However, whatever responsibility the government assumes for community roads tends to be dealt with as an extension of local government responsibilities. The 36,000 km network of classified district roads are managed by eighteen urban district councils (4,007 km)

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[35] Tanzania has several donor-financed pilot programs which are helping local communities to establish priorities and, in the case of roads and tracks, to get finance for improvement and new construction. The finance only covers costs of bought-out materials, leaving the local communities to carry out the works on a self-help basis, or pay for the labor themselves.